ENVIRONMENTAL ASSESSMENT

of the

FINAL RULE

amending the

ATLANTIC LARGE WHALE TAKE REDUCTION PLAN

GEAR MODIFICATIONS

DECEMBER 2001

National Marine Fisheries Service
National Oceanic and Atmospheric Administration
DEPARTMENT OF COMMERCE

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1.0 INTRODUCTION

Pursuant to Section 118 of the Marine Mammal Protection Act (MMPA), the National Marine Fisheries Service(NMFS) convened a team of stakeholders in 1996 to develop a plan for reducing the incidental by-catch of large whales in four commercial fisheries (lobster, monkfish, spiny dogfish, and multispecies) along the Atlantic coast. The group, called the Atlantic Large Whale Take Reduction Team (ALWTRT), consists of representatives from the fishing industry, the New England and Mid-Atlantic fishery management councils, state and federal resource management agencies, scientific community, and conservation organizations. The immediate goal of the ALWTRT was to draft a plan to reduce the incidental take of the four primary large whale species that interact with fisheries – the North Atlantic right whale (*Eubalaena glacialis*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), and minke whale (*Balaenoptera acutorostrata*) – to a level less than the potential biological removal level (PBR) within six months of implementation of the ALWTRT's plan.

Following the ALWTRT's initial set of meetings, NMFS developed a proposed Atlantic Large Whale Take Reduction Plan (ALWTRP) published on April 7, 1997 (64 FR 16519), which was later modified as an Interim Final Rule on July 22, 1997 (62 FR 39157), and finalized on February 16, 1999 (64 FR 7529). The ALWTRP was further modified by an Interim Final Rule on December 21, 2000 (65 FR 80368). The main elements of the ALWTRP include basic prohibitions on killing or injuring whales as well as a combination of broad gear modifications and time-area closures, which are being supplemented by progressive gear research, expanded disentanglement efforts, and extensive outreach efforts in key areas.

Under Section 7 of the Endangered Species Act (ESA), NMFS has reviewed the effect of fishery management activities on species listed as threatened or endangered. On June 14, 2001, NMFS issued Biological Opinions (BOs) for the monkfish, spiny dogfish, and multispecies Fishery Management Plan (FMP) and Federal regulations for the lobster fishery. It was concluded that the fishery management actions as proposed had the potential to jeopardize the continued existence of Western North Atlantic right whales. A reasonable and prudent alternative (RPA) was included in the BOs which contains a number of measures necessary to avoid jeopardy. One component of the RPA is modifications to the existing gear in the lobster and gillnet fisheries. The RPA established a deadline for a proposed rule for gear modifications in the Mid-Atlantic, Southeast and Offshore Lobster Waters by September 30, 2001, and a final rule by December 31, 2001.

The ALWTRT addressed localized gear issues in sub-groups following the February 2000 meeting of the full ALWTRT. Recommendations from the Mid-Atlantic and Southeast sub-groups addressed the adoption of gear modifications recommended by the Northeast sub-group. These broad based gear modifications were adopted in the Northeast lobster and gillnet fisheries through the December 21, 2000, interim final rule.

2.0 PURPOSE AND NEED

The purpose of this document is to examine the impacts to the environment that would result from the issuance of a rule to expand gear modifications, similar to those adopted in the Northeast, to the Mid-Atlantic and Southeast. There are proposed changes to gear requirements for the Offshore Lobster Waters as well which are considered in this document.

Since the interim final rule was published in December 2000, entanglements of whales have continued to occur. The need for further protective measures are defined by the ESA requirement to remove jeopardy and by the goals under the MMPA to reduce takes in commercial fishing operations to below PBR within 6 months of ALWTRP implementation and to a zero mortality rate goal within 5 years of ALWTRP implementation. In the case of the North Atlantic right whale these two goals are essentially the same as PBR has been defined as zero.

2.1 BACKGROUND

The complete background for the ALWTRP is found in Section 2.1 of the Environmental Assessment published on July 15, 1997 (NMFS 1997). The following background section is in reference to the specific actions to modify gear requirements for the ALWTRP.

The ALWTRP addresses fixed gear fisheries including the Northeast sink gillnet fishery, the Mid-Atlantic coastal gillnet fishery, the lobster trap/pot fishery, and the Southeastern Atlantic shark gillnet fishery.

The February 1999 final rule implements the regulatory tools of the ALWTRP which included a combination of broad gear modifications and time-area closures. However, the regulatory portion of the ALWTRP is supplemented by progressive gear research, expanded disentanglement efforts, extensive outreach efforts in key areas, and an expanded North Atlantic right whale surveillance program to supplement the Mandatory Ship Reporting System.

The interim final rule published on December 21, 2000 (65 FR 80368) modifies the February 1999 final rule (64 FR 7529) by changing requirements for the lobster and gillnet fisheries in the Northeast segment of the ALWTRP. Components of the December 2000 interim final rule included buoy line weak links, net panel weak links with anchoring systems, restrictions on number of buoy lines, and gear marking. This proposed action will address the expansion of broad based gear modifications to the Mid-Atlantic, Offshore Lobster Waters and Southeast U.S. Restricted Area.

NMFS convened the ALWTRT on June 27-28, 2001, to discuss, develop, and recommend to NMFS further management options to protect North Atlantic right whales. The recommendations for expansion of gear modifications to the Mid-Atlantic and Southeast includes buoy line weak links, net panel weak links and anchoring systems. These modifications apply to fisheries utilizing gillnets and lobster trap/pot gear. The ALWTRT also recommended a revised maximum strength for the buoy line weak link utilized in the Offshore Lobster Waters Area.

3.0 ALTERNATIVES

Several alternatives were considered that would reduce the threat of serious injury or mortality resulting from encounters with fixed gear in the Northeast, Mid-Atlantic, and Southeast waters. The alternatives considered in this analysis are identical to the alternatives considered in the October 2000, EA for the interim final rule adopting gear modifications in the northeast. The alternatives considered are within the scope of the action, are technically feasible, and are approaches that have been discussed in the ALWTRT process. Based on these facts NMFS believes it is appropriate to utilize the same alternatives in this EA. In general, the methods by which gear modification strategies are applied to fixed gear are weak links in surface and bottom components of fixed gear and reduction of fixed gear placed in the water column or restrictions on how that gear is fished. NMFS utilized gear research results and ALWTRT recommendations to develop the Preferred Alternative (PA) and the Non-Preferred Alternatives (NPAs) described below.

3.1 PROPOSED ACTION

This final rule would modify the existing interim final rule published on December 21, 2000. Changes include the expansion of gear modifications to the Southern Nearshore Waters lobster trap and Mid-Atlantic Coastal Waters gillnet fisheries, reduction in the maximum breaking strength for buoy weak links used in the Offshore Lobster Waters Area and an additional system weak link for the Offshore Lobster Waters, as well as restrictions to fishing methods for gillnets in the Southeast unless an exemption for shark gillnets applies.

The following proposed actions are in addition to the existing broad area closures in the Cape Cod Bay, Great South Channel and the Southeast.

1. The existing Southern Nearshore Lobster Waters requirement to choose one item from the Lobster Take Reduction Technology List would be replaced with a requirement for a knotless buoy line weak link with a maximum breaking strength of 600 lbs (272.4 kg). These gear modifications are proposed as a year round requirement.

2. The Offshore Lobster Waters Area requirement for a 3780 lb (1714.3 kg) weak link at the buoy would be replaced by a reduced strength weak link with a maximum breaking strength of 2000 lbs (906.9 kg)at all buoys. A weak link with a maximum breaking strength of 3780 lbs (1714.3 kg)in the system located between the surface system (meaning all buoys, floats, highflyer and associated line) and the subsurface system (meaning the buoy line

leading to the trawl on the ocean floor) has changed from the proposed rule to the final rule since the publication of this proposed measure. NMFS technical experts have re-evaluated this proposed measure and found this measure to not be practical from a mechanical standpoint. Given that any whale that is caught below the link would be pulling against nothing more than the surface system and the buoy, one cannot reasonably conclude that the resistance involved would be sufficient to trigger the break of the weak link. This change may slightly bias the cost estimated in the EA. However, it will not change the conclusions.

3. The Lobster Take Reduction Technology List would be amended to remove the option to utilize a line of 7/16" (1.11 cm) or less in diameter. The effective date for this change would be held until January 1, 2003. An additional amendment to the list would be to allow the use of sinking and/or neutrally buoyant line to comprise the buoy lines and groundlines as a risk reduction measure.

4. The Mid-Atlantic Waters anchored gillnet requirement to utilize one item from the Gillnet Take Reduction Technology List would be replaced by a mandatory requirement to utilize a knotless buoy line weak link and a weak link at the center of each 50 fathom net panel, or every 25 fathoms for longer nets. The maximum strength of both of these links would be 1100 lbs (498.9 kg). A new requirement is proposed for gillnets to return to port with the vessel or be anchored with an anchor strength equivalent to a 22 lb (10.0 kg) Danforth anchor at each end of net string.

5. The Southeast U.S. Restricted Area would expand prohibitions to include no straight sets of gillnets at night between November 15 and March 31, unless an exemption for shark gillnets applies.

6. The Gillnet Take Reduction Technology list would be amended to remove the option to utilize a line of 7/16" (1.11 cm) or less in diameter and allow for the buoy line to be comprised entirely of sinking and/or neutrally buoyant line as a risk reduction measure.

3.2 NO ACTION ALTERNATIVE

The No Action alternative would leave in place the existing regulations from the 1997 interim final rule, 1999 final rule and the 2000 interim final rule.

3.3 FULL WEAK LINKS AND FLOATING LINE REDUCTION

The Full Weak Links and Bottom Line Reduction alternative would combine the Proposed Action requirements for weak links at the surface of fixed gear with additional requirements for bottom weak links and the reduction of floating line as well.

3.4 BUOY LINE REMOVAL AND FLOATING LINE REDUCTION

The Buoy line Removal and Floating Line Reduction alternative would eliminate the need for weak links at the surface and bottom while maximizing the reduction of fixed gear in the water column through the use of a remote control type release mechanism which would hold the buoy and buoy line on the bottom until the fisherman activated a release mechanism.

4.0 AFFECTED ENVIRONMENT

The affected environment was discussed in detail in Section 6.0 of the Environmental Assessment published on July 15, 1997 (NMFS 1997). The physical area affected by this action is the Northeast Region of the East Coast from Maine to North Carolina and an area off the Florida-Georgia coast. The specific areas affected by this final rule are the Mid-Atlantic Coastal Waters, Southern Nearshore Lobster Waters, Offshore Lobster Waters and the Southeast U.S. Restricted Area as defined by the ALWTRP. The biological resources potentially affected by this action are also described in detail in of the Environmental Assessment published on July 15, 1997 (NMFS 1997), and updates are provided in Section 4.1 below. The main goal of the ALWTRP is to reduce serious injury and mortality of large whales. The alternatives were developed to accomplish that goal by reducing the threat of injury to large whales from entanglement in fixed fishing gear. Therefore, the general effect of these alternatives to large whales (the primary marine resource affected by this action) should be beneficial.

4.1 STATUS OF THE LARGE WHALES

The status of the large whales is discussed in detail in Section 2.2 of the Environmental Assessment published on July 15, 1997 (NMFS 1997). The following is provided as an update of that section.

The information in this section is from the 2000 Marine Mammal Stock Assessments (Waring et al., 2000), and from entanglement reports compiled by NMFS between 1998 and 2001. The detailed reports for entanglements up to 1998 are contained in the 2000 Stock Assessment Report (SAR). Summaries of the 1998, 1999, 2000, and 2001 entanglements are provided below for each species. Additional information about the population biology and human-caused sources of mortalities and serious injuries are included in the 2000 Marine Mammal Stock Assessments which are available from NMFS and on NMFS internet web page at (www.nefsc.nmfs.gov/psb/assesspdfs.htm).

4.1.1 North Atlantic Right Whale

The North Atlantic right whale is the rarest of all large cetaceans and one of the most endangered species in the world. The western North Atlantic population is estimated at 291 animals (Kraus et al., 2000) and is unlikely to be significantly higher. A recent

International Whale Commission (IWC) workshop on the status and trends in this population (IWC, 2000) concluded that survival has declined. Due to the decline in survival, evidenced by the decline in calving rates and increase in calving interval, the PBR level for this population has been set to zero.

Approximately one-third of all known North Atlantic right whale mortality is caused by human activities (Kraus, 1990). Further, the small population size and low annual reproductive rate suggest that human sources of mortality may have a greater effect on population growth rates of the North Atlantic right whale than on those of other whales. The principal factors retarding growth of the population are believed to be ship strikes and entanglement in fishing gear (IWC, 2000).

For the period 1994 through 1998, the total human-caused mortality and serious injury to North Atlantic right whales is estimated as 1.4 incidents per year. Of this figure, 0.8 incident per year is attributed to entanglements and 0.6 to ship strikes. Note that some injuries or mortalities may go undetected, particularly those that occur offshore. Therefore, the estimates above should be considered minimum estimates.

In 1998, four North Atlantic right whales were reported entangled. On July 12, two North Atlantic right whales were found trapped in a weir near Grand Manan Island, Canada and were released 2 days later without apparent harm. Another North Atlantic right whale was seen entangled in rope of unidentified origin on August 15 near Mingan Island in the Gulf of St. Lawrence. The whale was too active to approach safely to disentangle it, and appeared to free itself of most of the gear. One North Atlantic right whale was entangled twice (and actually disentangled three times) in Cape Cod Bay. The whale had been first seen entangled in 1997 in the Bay of Fundy. On July 24, 1998, the whale was seen near Dennis, Massachusetts (Cape Cod Bay), where most, but not all of the gear it had been carrying from the 1997 entanglement was removed. NMFS has not been able to identify the type of gear responsible for this 1997 entanglement. The same whale was seen again near Provincetown, Massachusetts, on September 12 with a lobster buoy line through its mouth, and that gear was removed. The same whale was seen again 2 days later (September 14) near Barnstable, Massachusetts, where it had picked up additional lobster gear which was also removed by the NMFS-supported disentanglement team. At last report, the whale was swimming freely but still had a thin line in its mouth from the 1997 entanglement, which is now believed to represent a serious injury to that animal as it may interfere with its ability to feed.

In 1999, six North Atlantic right whales were reported entangled. The gear was completely removed from one animal, and most of the gear was removed from two others. Although some gear was removed from a fourth animal, it ultimately died from the entanglement. The last two animals were sighted offshore (one in the US and one in Canada) but could not be relocated.

In 2000, a total of five confirmed North Atlantic right whale entanglements were sighted in the Gulf of Maine (both in US and Canada). One whale was completely disentangled, one whale was not a candidate for rescue due to its minor entanglement and one whale remained entangled and required further assessment. The disentanglement team was unable to respond to two entangled North Atlantic right whales. One is an unidentified North Atlantic right whale, sighted and lost by aerial survey in the Bay of Fundy, Canada. The other was sighted by aerial survey too far offshore on two occasions. This whale has been determined to have a minor entanglement.

In 2001, two North Atlantic right whale entanglements have been reported thus far. One whale, identified as #1102, was first sighted in the Great South Channel on June 8. The disentanglement team assessed that the whale was in grave condition due to the serious nature of the entanglement and attached a telemetry buoy to track the movement of the whale. On June 26, the team attempted to disentangle the whale by first administering two doses of Midazolam, which the team hoped would sedate the whale and slow it down enough for the team to approach the head of the whale where the gear was lodged in the rostrum. However, the sedative did not produce the desired effect and the team had to further assess the condition of the whale for future disentanglement attempts. On July 14, the team made another trip out to the whale to attempt disentanglement. The whale was injected with the sedative twice, but, once again, the team noticed no effect on the whale and could not attempt disentanglement. At present, the whale is being tracked by a telemetry buoy in order to monitor it for future disentanglement attempts. On July 20, 2001, North Atlantic right whale #2427 was spotted 30 miles east of Portsmouth, NH, by a whale watch vessel. The animal was entangled in offshore lobster gear. The surface system, meaning surface buoys, high flyer and associated line, was entangled around the animals rostrum. The Center for Coastal Studies disentanglement team responded to and successfully disentangled the animal and the animals has since been sighted in the Great South Channel area on July 28, 2001.

Details of these events are available from NMFS Northeast Region contact or on NMFS Protected Resources Division of Northeast Region website (www.nero.nmfs.gov/ro/doc/nero.html).

4.1.2 Humpback Whale

The best estimate of abundance for North Atlantic humpback whales is 10,600 (Smith et al., 1998). The minimum population estimate for this stock is 10,019 (Waring et al., in prep). Within this population, the humpback whales in the Gulf of Maine constitute a distinct, relatively small, feeding stock. However, it is not genetically distinct from other sub-populations in the western North Atlantic, which are all treated as a single stock for the purposes of the ALWTRP and the estimation of PBR. For purposes of the current stock assessment, the maximum net productivity rate for western North

Atlantic humpback whales is assumed to be 0.065 (Barlow and Clapham, 1997). The PBR level for this stock is 32.6 humpback whales per year.

For the period 1994 through 1998, the total estimated human-caused mortality and serious injury to humpback whales in U.S. waters is estimated as 3.65 per year. This is derived from three components: (1) Entanglements that have been reported by NMFS observers equate to 0.25 per year, (2) additional fishery interaction records make up another 2.4 per year, and (3) vessel collision records which account for the remaining 1.0 per year

In 1998, twelve humpback whales were reported entangled. One whale died in gillnet gear off North Carolina before the fisherman could remove the gear, and another was found dead on the beach with clear evidence of entanglement on its flukes. The gear was completely removed from four animals, and most of the gear was removed from one other. Three animals were not resighted and two were involved in minimal entanglements for which no disentanglement attempt was deemed necessary.

In 1999, Nine humpbacks were reported entangled. One whale was found dead on the beach with clear evidence of entanglement. Gear was completely removed from three animals and most of the gear was removed from another whale. The Canadian disentanglement team attempted to disentangle a humpback in the Bay of Fundy but was unsuccessful. No attempt was made to disentangle two animals as they were deemed to be minimal entanglements. One entangled humpback was found while the disentanglement team was involved in a North Atlantic right whale event, unfortunately the whale could not be located. .

In 2000, a total of eleven confirmed reports of entangled humpback whales were reported. Three were not located by responders as no one was able to stand by. Two were too far to shore for response. Two were at large and not assessed. One was at large and was assessed as a not life threatening entanglement. Two were found and, although disentanglement was not possible, the animals were later seen free of gear. One was successfully disentangled by the Network.

In 2001, to date there have been a total of six reports of entangled humpback whales - four in the Mid-Atlantic and two in the Northeast. On February 12, a juvenile humpback was sighted entangled in gillnet gear near Cape Hatteras, NC. However, after being caught in the gear for about an hour, the whale was able to free itself. On April 8, two humpbacks were reported stranded in South Carolina, both had evidence of previous entanglements with gear. On April 9, a dead juvenile humpback was found floating in coastal gillnet gear off Virginia Beach, VA. A humpback whale was reported in Southwest Stellwagen Bank on July 25, 2001, with a minor entanglement, which the team assessed was not life threatening and, therefore, disentanglement was not attempted, but the team will continue to monitor the whale. Finally, on August 15, 2001, another entangled humpback was sighted in Southwest Stellwagen Bank, which the disentanglement team responded to and completely freed.

Details of these events are available from the NMFS Northeast Region contact or in the NMFS Protected Resources Division of Northeast Region website (www.nero.nmfs.gov/ro/doc/nero.html).

4.1.3 Fin Whale

The best available estimate of abundance for the western North Atlantic fin whale is 2,200, which is considered conservative (Waring et al., in prep). The minimum population estimate is 1,803 (ibid.). For purposes of the current stock assessment, the maximum net productivity rate for fin whales is assumed to be 0.04. The PBR for this stock is 3.6.

Entanglements of fin whales are rarely documented. Because of the paucity of stranded animals or other records, NMFS has not calculated an average entanglement rate, although it believes that serious injuries or mortalities due to entanglements of fin whales occur at a rate below 10 percent of PBR. A review of 26 records of stranded or floating (dead or injured) fin whales for the period of 1992 through 1996 showed that three had formerly been entangled in fishing gear. Two of these had net or rope marks on the body, and one had line through the mouth and around the tail. Two fin whales were reported entangled in 1998; one was not resighted and the other was a floating carcass found off Digby, Nova Scotia, Canada with netting through the mouth and around the tail flukes. Three fin whales were reported entangled in 1999, all in Canada. Disentanglement attempts were made by the Canadian team on two; one was successfully disentangled, the other was not. The third animal was not resighted. There were no reports of entangled fin whales in 2000. In 2001, one fin whale has been reported with a minor entanglement which is not serious and is likely to free itself.

4.1.4 Minke Whale

Minke whales off the eastern coast of the United States are considered to be part of the Canadian east coast population, which inhabits the area from the eastern half of Davis Strait south to the Gulf of Mexico. The best estimate of the population is 3,810 (Waring et al., in prep.), which is considered conservative. The minimum population estimate for Canadian east coast minke whales is 3,097 (ibid.). The current and maximum net productivity rates are not known, but the maximum rate is assumed to be 0.04. The PBR for this stock of minke whales is 31. Three minke whales were lost by the reporting vessels before Network response was made. One was successfully disentangled by the disentanglement team. In 2001, one entangled minke whale was reported off Cape Cod, which was determined to be minor.

5.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

The biological resources potentially affected by this action are described in detail in the environmental assessment published on July 15, 1997 (NMFS, 1997). The main goal of the ALWTRP is to reduce serious injury and mortality of large whales. The Amendments to the MMPA provide a goal of reducing take in commercial fisheries to below PBR and also of reaching a ZMRG. For North Atlantic right whales, this provides us with the goal of eliminating serious injury or death resulting from incidental take in commercial fisheries. Under the ESA we must also ensure that any action the agency authorizes, such as commercial fishing for lobster, monkfish, multispecies and dogfish, does not jeopardize the continued existence of North Atlantic right whales. This proposed action was developed to facilitate reaching those goals by reducing the threat of injury to North Atlantic right whales from entanglement in fixed fishing gear. Therefore, the general effect of this action to North Atlantic right whales (the primary marine resource affected by this action) is expected to be beneficial. Other marine mammals which are present in an area subject to gear modifications would benefit from a reduced probability of entanglement. Non marine mammal species known to be affected by fixed gear are, of course, the fish species for which the gear is targeted. The environmental affects of the gear on targeted species are contained in the environmental documents for their FMPs. Leatherback sea turtles are known to become entangled in lobster buoy lines. However, the entanglement mechanism is similar to what happens with large whales. Therefore, the environmental consequences of each alternative to leatherback turtles will be similar to that for large whales.

Lobster and gillnet fishermen who operate in the areas described earlier in this proposed action will also be affected.

5.1 PROPOSED ACTION

The specific gear modifications contained in the proposed action are described in the Biological Impacts Section with a description of the risk reduction benefit. The economic and social impacts are also discussed in the associated sections.

5.1.1 Biological Impacts

The weak link at the buoy is intended to increase the likelihood that a line sliding through a whale's mouth will break away quickly at the buoy before the whale begins to thrash and become more entangled. The breakaway device is expected to reduce risk in cases where a whale encounters the gear and gets line through its mouth or around an appendage at a point close to the buoy, which addresses one of the three strategies for gear modification recommended by the ALWTRT. These strategies are: (1) weak links in the surface section of fixed gear, (2) weak links in the bottom section of fixed gear, and (3) reduced vertical lines in the water column.

The required breaking strength of 2000 lb (906.9 kg) for the offshore lobster buoy line weak links in the proposed action was determined through cooperative research with the offshore lobster component of the fishery. This is a reduction from the previous maximum strength of 3780 lbs (1714.3 kg) and increases the likelihood that an entangled animal could part the line and potentially break free of the line. The 3780 lb (1714.3 kg) weak link was retained for use in the Offshore Lobster Waters Area but placed between the surface system (meaning all buoys, high flyer and associated line) and the subsurface system (meaning the buoy line leading to the trawl on the ocean floor) has changed from the proposed rule to the final rule since the publication of this proposed measure. NMFS technical experts have re-evaluated this proposed measure and found this measure to not be practical from a mechanical standpoint. Given that any whale that is caught below the link would be pulling against nothing more than the surface system and the buoy, one cannot reasonably conclude that the resistance involved would be sufficient to trigger the break of the weak link. This change may slightly bias the cost estimated in the EA. However, it will not change the conclusions.

The required breaking strength in the proposed action of 1100 lb (498.9 kg) for the anchored gillnet gear buoy line weak links is the same as that specified in the Gillnet Take Reduction Technology List in the final rule. This option on the technology list was developed based on a recommendation from the GAG at its June 1997 meeting. The NMFS gear research staff is conducting further investigation for gillnet weak links along with the offshore lobster testing mentioned above. NMFS will continue to investigate the lowest possible breaking strength possible for use in the gillnet fisheries.

The NMFS gear research staff have tested various types of buoy line weak links and provided fishermen with a list of tested devices for use in the proposed action that include swivels, plastic weak links, rope of appropriate diameter, hog rings, and rope stapled to a buoy stick. They will continue to test any device fishermen claim will work as a weak link and provide them with feedback on whether the breaking strength is in compliance with current ALWTRP regulations.

Buoy line weak links would be required by the proposed action to be knotless when the weak link fails because a weak link that breaks but leaves a knot or other obstruction at the end of the line leading down to the gear would have reduced effectiveness. A knot or piece of a broken link could become lodged in the whale's baleen or around an appendage of a whale or any other large marine organism such as leatherback sea turtles, and prevent the line from slipping through either the baleen or appendage. Observations of North Atlantic right whale jaw anatomy suggest that even a bare line would be difficult to pull through a whale's mouth when the jaw is clamped shut. Testing on baleen obtained from stranded whale carcasses has shown that knots hinder the passage of line through the baleen.

Requiring a knotless buoy line for all gillnet and lobster trap gear set in waters regulated by the ALWTRP will significantly increase the probability that a large whale can survive an encounter with buoy lines rigged in this fashion.

The knotless buoy line and the weak link that leaves a knotless end upon breaking are easily confused. Although the ALWTRT initially recommended requiring knot-free buoy lines, it changed to recommending a voluntary measure because fishermen frequently need to repair and re-tie buoy lines at sea. The knot-free buoy line concept is similar to the breakaway buoy concept, where the objective is to keep knots from hanging up in a whale's baleen or around an appendage and preventing the line from sliding out. In addition to the proposed action, NMFS would recommend the use of splices wherever possible because splices do not increase entanglement threat. However, connecting lines using a splice is not practicable while gear is being hauled, so splicing, if used at all, is usually done on land during seasonal overhaul or as new gear is added. Although concepts for devices to join lines quickly at sea have been proposed, none are yet developed. At the June 27-28, 2001, ALWTRT Meeting there was discussion describing a device to join lines quickly at sea and NMFS has funds available to support such initiatives though none have been developed yet.

Many (approximately 50%) of the fishermen currently use splices in the middle of their buoy and anchor lines to avoid the weakening affect of knots. Encouraging fishermen to use splices wherever possible will supports this practice. Reducing knots in the middle of lines appears to be a good practice, but when it comes to possible effects to large whales, the fact that a knot reduces the breaking strength by at least 50% means that knots in the middle of lines may not increase the threat of serious injury from an encounter with these lines.

The proposed action would require weak links in the center of each 50-fathom (300 ft = 91.4 m) net panel floatline (headrope) that are expected to break when a whale exerts pressure in opposition to the resistance provided by the anchoring system and weight of the gear. The weak link would allow the floatline to part and unravel from the net mesh when a whale encounters any section of the gear. The net mesh would then be free of the stronger floatline and a large whale would have a better chance of breaking free of the weaker monofilament mesh.

The net panel weak link requirement that would be contained in the proposed action specifies a breaking strength of no more than 1100 lb (498.8 kg). This breaking strength is a significant reduction from the floatline strength typically used in sink gillnet gear, which ranges from 1700 lb (771.8 kg) to 2500 lb (1135 kg). However, the use of weak links is not expected to hinder retrieval of the gear, as gillnetters would be able to haul their gear by the lead line and the full-strength bridles between net panels.

The Mid Atlantic gillnet anchoring requirement in the proposed action is intended to create sufficient resistance to allow the net panel weak links to break when at least 1100 lb (498.8 kg) of pressure is exerted by a whale on the net string. The specified anchoring system would only be required for net string not returning to port with the vessel.

In the proposed action, the net panel weak links would be required in the center of each net panel floatline, rather than between net panels as was specified for the gillnet technology list option in the final rule. NMFS proposes to change the placement of the net panel weak links because a weak link placed at the bridle might cause a failure at a point in the gear which is critical for safe hauling of the gear and to reduce chances of lost gear. Furthermore, in cases where a whale hits the gear near a weak link in the floatline, a breaking point within that floatline would maximize the chance for the whale to break away from the net as soon as possible, before becoming entangled in the mesh itself. Once a whale becomes entangled in the mesh itself, there is a greater chance that other parts of the gear including the heavier lines would contribute to the seriousness of the entanglement. The final rule also contains a provision to change the gillnet technology list to reflect a change in position of the weak link from the bridle between nets to the floatrope.

Requiring gillnet panel weak links and anchoring systems for nets not returning to port with the vessel for gillnet gear set in waters regulated by the ALWTRP will significantly increase the probability that a large whale can survive an encounter with gillnets rigged in this fashion.

5.1.2 Economic Impacts of the Proposed Action (PA)

Under the PA plan vessels fishing lobster in the northern inshore, northern offshore and southern nearshore area must attach weak links to the buoy line of appropriate breaking strength. Vessels fishing sink gillnet gear must attach a weak link at the buoy line and the middle of each 50 fathom net panel, or every 25 fathoms in the case of longer panels, and fish with an appropriate anchor. These gear modifications are outlined in Section 3.1 and the costs are estimated here. For a full understanding of the economic framework presented here, see Section 8 first.

5.1.2.1 Lobster Fleet (PA)

Southern nearshore lobster fleet
Under the 2000 PA plan (NMFS, 2000), the southern nearshore lobster fleet had to choose one option off the technology list. We assumed at that time the fleet chose the 600 pound breaking strength weak link over the more costly option of sinking line in the ground and buoy line. Although the 600 pound breaking strength weak link is now mandatory under the 2001 PA, this is a no cost change since the burden was incurred under the 2000 PA plan.

Northern offshore lobster fleet
Vessels in the northern offshore lobster fishery must attach a weak link at the buoy rope. For this analysis, it is assumed vessels will use a “rope of appropriate breaking strength” as a weak link. A 5/16" poly rope has a breaking strength of approximately 1750 pounds, and the unit cost is $0.08 for 3 feet. Assume further that it requires 10

minutes of labor to splice in a 3 foot “rope of appropriate breaking strength” per weak link.

Gear and vessel estimates
According to 1999 VTR data, vessels fished 800 traps per trip in the northern offshore area, however, they are allowed to fish up to 1800 traps if they fish exclusively offshore. Consider the 800 traps as an lower bound estimate of traps per vessel owner, and the 1800 traps as an upper bound estimate. Assume vessels fish 40 traps per lobster trawl on average.

Using the lower bound estimate of 800 traps fished, the number of “40 trap trawls” fished per vessel is potentially 20 (20=800 traps/40 traps per trawl). Assuming 2 buoy lines are used for multiple trap trawls, then the total lower bound estimate of the number of buoy lines is 40. Using similar calculations, the upper bound estimate for the northern offshore is 90 buoy lines per vessel on average.

Total vessel and industry cost
The lower bound (LB) cost of materials per vessel to splice in weak links at the buoy rope is $3 ($3=40 buoy lines * $0.08), labor cost is $94 ($94 = 40 buoy lines * (10/60) hours to splice per weak link * $14.05 per hour) with a average lower bound cost per vessel of $97 ($97=$3 + $94). Similarly, assuming a vessel fishes all 1800 traps, the average upper bound cost per vessel is $218.

Based on recorded fishing activity in the 2000 NEFSC Vessel Trip Report database for 30 vessels greater than 50 feet long in this area, the average vessel fishing lobster gear fishes 10.8 months of the year (CV=0.16), on 30 trips (CV=0.20) for 190 days (CV=0.37) with an annual revenue of $531,200 (CV=0.45). Lobster landings per vessel were 114,140 pounds (CV=0.50) per year. The cost of the PA plan would reduce a vessel’s annual revenue between 0.01% (0.0001=$97/$531,200) and 0.04% (0.0004=$218/$531,200).

There are 172 vessels potentially fishing lobster trawls in the northern offshore area (Bisack, in review). The lower and upper bound total industry cost is $16.7K ($16.7 = 172 vessels * $97 cost per vessel) and $37.5K ($37.5K = 172 vessels * $218 cost per vessel) to splice in a “rope of appropriate of appropriate breaking strength” as a weak link at the buoy rope, respectively.

Northern inshore lobster fleet
The 7/16 inch line is eliminated from the technology list. Vessels in the northern inshore lobster fishery may use a weak link at the buoy rope as an alternative option to the 7/16" line. Seven hog rings or a plastic weak link is an appropriate weak link that breaks at 1100 pounds. We assume vessels will use seven hog rings on 50% of their buoy lines and plastic swivels on the remaining 50%. Seven hog rings have a unit cost of $0.07 and one plastic swivel costs $1.25 on average, and we assume it takes 5 minutes of labor to install. The 50% split of vessels using hog rings and plastic swivels gives an average

cost between these two weak links since we do not know which weak link a vessel would choose.

Gear and vessel estimates
According to 1999 VTR data, vessels fished 240 traps per trip in the northern inshore area, however, they are allowed to fish up to 800 traps. Consider the 240 traps as an lower bound estimate of traps per vessel owner, and the 800 traps as an upper bound estimate. Based on Wilson's (1997) work, 50% of the vessels fishing lobster traps in the inshore area of Maine use 2 traps per lobster trawl, and the remaining 50% use 15 traps per lobster trawl, on average.

Using the lower bound (LB) estimate of 240 traps fished, then number of "pair trawls" fished per vessel is potentially 60 (60=240 traps*0.5 trawls are pair traps/2 traps per trawl), and the number of "15 trap lobster trawls" is 8 (8=240 traps*0.5 trawls of 15 traps/ 15 traps). Assuming pair trawls have 1 buoy line and multiple trap trawls have 2 buoy lines, then the total number of buoy lines is 76 (76 buoy lines=60 traps*1 buoy line + 8 trawls*2 buoy lines). Using similar calculations, the upper bound estimate of buoy lines is 254 per vessel which consists of 200 buoy lines for 200 "pair trap trawls" and 54 buoy lines for 27 trawls of "15 trap trawls"

Total vessel and industry cost
The lower bound (LB) average cost of materials per vessel to splice in weak links at the buoy rope is $50 ($50 = 0.5*76 buoy lines * $0.07 per seven hog rings + 0.5 * 76 buoy lines*1.25 per plastic weak link), labor cost is $89 ($89 = 76 buoy lines * (5/60) hours to splice per weak link * $14.05 per hour) with a total lower bound cost per vessel of $139 ($139=$50 + $89). Similarly, assuming a vessel fishes all 800 traps, the average upper bound cost per vessel is $648.

Based on recorded fishing activity in the 2000 NEFSC Vessel Trip Report database of 218 vessels fishing in this area, the average vessel fishing lobster gear fishes 10 months of the year (CV=0.23), on 107 trips (CV=0.39) with an annual revenue of $140,900 (CV=0.62). Lobster landings per vessel were 31,800 pounds (CV=0.64) per year. The cost of the PA plan would reduce a vessel's annual revenue between 0.1% (0.001=$139/$140,900) and 0.5% (0.005=$648/$140,900).

There are 5,982 vessels potentially fishing lobster trawls in the northern nearshore area (Bisack, in review). The total lower and upper bound industry cost is $0.8M ($0.8 = 5982 vessels * $139) and $3.9M to attach a plastic weak link and seven hog rings as a weak link at the buoy rope, respectively.

5.1.2.2 Mid-Atlantic sink gillnet fleet (PA)
Under the PA vessels fishing sink gillnet gear are required to make 3 gear changes which include:1) attaching a weak link at the top of the buoy line; 2) attach a weak link in the middle of each 50 fathom net panel; and 3) if they do not return with their gear to port the gear must be anchored with an anchor strength equivalent to a 22 pound

danforth anchor. These gear changes are required for all sink gillnet gear which does not return to port with the vessel.

NEFSC observer data were used to estimate the number of strings and net panels per string fished on average, as well as the average anchor weight. Some vessels do not use anchors. Vessels which return to port with their gear typically do not attach anchors and the soak time of the string is less than 8 hours. Based on two years of observer data (1999 and 2000) from December 31 to March 31 (highest chance of a right whale encounter), all vessels sampled from New York, New Jersey and Maryland leave their gear in the water over night. In Virginia and North Carolina, 94% and 47% of the vessels leave their gear in the water over night, respectively.[1] The three gear changes above are required of these vessels who leave their gear in the water over night.

Weak links on the buoy rope and in the middle of each net panel. Vessels fishing gillnet gear who do not return to port with their gear, must attach weak links on buoy lines It is assumed vessels will use a "rope of appropriate breaking strength" such as 1/4" poly as a weak link at the buoy rope where the unit cost is $0.06 for 3 feet. Assume it requires 10 minutes labor to splice in a 3 foot "rope of appropriate breaking" per weak link.

In Virginia (Table 5.1.2.1), average material costs per vessel to attach weak links at the buoy rope are $0.65 (5.4 strings * 2 buoy ropes per string*$0.06 for rope), average labor cost is $25.29 (5.4 strings*2 buoy ropes per string*(10/60) hours of labor * $14.05 (hourly wage rate by U.S. Bureau of Labor)) and the total cost is $25.94 (=$0.65 + $25.29). Using similar calculations the cost to attach weak links at the buoy rope per vessel in other Mid-Atlantic states can be found in Table 5.1.2.1.

Total industry cost to attach weak links at the buoy rope is $10.4K (Table 5.1.2.1). The cost per vessel ranges between $16.33 in New Jersey to $26.42 in New York on average.

Table 5.1.2.1 Number of observed trips, strings fished on average, total number of vessels in the gillnet fleet, percent and number of vessels who leave gear in the water overnight, and the material, labor and total cost per vessel, and total industry cost to attach weak links at the buoy rope, by state.

[1] The soak time was less than 8 hours for Virginia and North Carolina vessels which fish without anchors.

State	Observed Trips	Average Strings	Total Vessels	Vessels using anchors and gear over night		Cost per Vessel ($1)			Total Industry Cost($1)
				%	No.	Material	Labor	Total	
NY	36	5.5	54	100	54	0.66	25.76	26.42	1,427
NJ	94	3.4	113	100	113	0.41	15.92	16.33	1,845
MD	30	4	23	100	23	0.48	18.73	19.21	442
VA	122	5.4	130	94	122	0.65	25.29	25.94	3,170
NC	166	5.1	305	47	143	0.61	23.89	24.50	3,512
Total									10,395

Weak links on net panels
Vessels fishing gillnet gear who do not return to port with their gear, must attach weak links on each 50 fathom net panel. It is assumed vessels will use a "rope of appropriate breaking strength" such as 1/4" poly as a weak link at the buoy rope where the unit cost is $0.06 for 3 feet, and it requires 10 minutes of labor to splice in a 3 foot rope per weak link.

In Virginia (Table 5.1.2.2), average material costs are $1.00 (5.4 strings * 3.1 nets panels per string*$0.06 per rope), average labor costs are $39.20 (5.4 strings*3.1 net panels per string*(10/60) hours of labor * $14.05 (hourly wage rate by U.S. Bureau of Labor)) and the total cost is $40.20 (=$1.00 + $39.20) per vessel. The total industry cost to attach weak links in net panels is $4,913 ($4,913 = 122 vessels * $40.20 cost per vessel) in Virginia. Using similar calculations these costs are estimated for the other Mid-Atlantic states (Table 5.1.2.2)

Total industry cost is $28.0K to attach weak links on each net panel (Table 5.1.2.2). Cost per vessel ranges between a low of $40.20 (in Virginia) to a high of $93.09 (in New Jersey) on average.

Table 5.1.2.2 Number of observed trips, strings and nets per string fished on average, total number of vessels who leave gear in the water overnight, and the material, labor and total cost per vessel, and total industry cost to attach weak links on each net panel, by state.

State	Observed			Vessels using Anchors	Vessel ($1)			Industry Total ($1)
	Trips	Average			Material	Labor	Total	
		Strings	Nets per String					
NY	36	5.5	4.2	54	1.39	54.09	55.48	2,996
NJ	94	3.4	11.4	113	2.33	90.76	93.09	10,519
MD	30	4	8.5	23	2.04	79.62	81.66	1,878
VA	122	5.4	3.1	122	1.00	39.20	40.20	4,913
NC	166	5.1	4.4	143	1.35	52.55	53.90	7,726
Total								28,031

Return gillnet gear to port or be anchored with an anchor strength equivalent to 22 lb Danforth
All vessels sampled in New York, New Jersey and Maryland had anchors attached and all were greater than 22 pounds, except 16% of the hauls in New Jersey (Table 2). Assuming these vessels are representative of their state, we could further assume 16% (or 18 = 113*0.16) of the vessels in New Jersey will have to purchase new anchors similar to a 22 pound danforth.

Of the vessels sampled in Virginia and North Carolina 94% and 47% used anchors, respectively. "All" anchors in Virginia but 47% of anchors used in North Carolina are greater than 22 lbs. This suggests that of the 143 (143 = 305*0.47) vessels that use anchors on gillnets in North Carolina, approximately 76 (76=143*0.53) vessels will need to purchase new danforth anchors.

Assuming NEFSC observer data are representative of each mid-Atlantic state, the average cost per vessel in New Jersey and North Carolina are $465 ($465=3.4 strings*2 anchors per string*$66.99 per 25lb danforth anchor[2]) and $683 ($683=5.1 strings fished* 2 anchors per string*$66.99 per 25lb danforth anchor), respectively. Total industry costs are $8,236 ($8,236 = 18 vessels * $465) and $51,914 ($51,914=76 vessels*$683 cost per vessel) in New Jersey and North Carolina, respectively, with a of $60.15K for both states.

Suppose the observer data were not representative of all vessels, what would it cost on average for everyone to purchase anchors? The total industry cost would be approximately $406K for every vessel fishing sink gillnet gear to purchase new 25lb danforth anchors.

Total Vessel and industry cost
In the Mid-Atlantic (southern nearshore and southern offshore area), the cost per vessel is $657 under the PA plan to attach weak links at the top of the buoy line, in the middle of each 50 fathom net panel, and to purchase a 22 pound danforth anchor (Table 5.1.2.4). The total industry cost is $98.6K.

Based on recorded fishing activity in the 2000 NEFSC Vessel Trip Report database for 156 vessels in this area, the average vessel fishing sink gillnet gear fishes 8.2 months of the year (CV=0.39), on 70 trips (CV=0.65) with an annual revenue of $89,000 (CV=0.94). Landings per vessel were 144,100 pounds of fish (CV=0.50) per year. The cost of the PA plan would reduce a vessel's annual revenue by 0.7% (0.007=$657/$89,000).

5.1.2.3 Summary of PA
In the northern inshore area, the average lower and upper bound cost per vessel in the lobster fleet under the PA plan is $139 and $648,

[2] Costs for a 22 pound danforth anchor were not available, however they were available for a 25 pound anchor and used here as a substitute.

respectively (Table 5.1.2.3). The cost of the PA plan would reduce a vessel's annual revenue between 0.1% (0.001=$139/$140,900) and 0.5% (0.005=$648/$140,900). Given there are 5,982 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $832K and $3,877K, respectively.

In the northern offshore area, the average lower and upper bound cost per vessel in the lobster fleet under the PA plan is $97 and $218, respectively. The cost of the PA plan would reduce a vessel's annual revenue between 0.01% (0.0001=$97/$531,200) and 0.04% (0.0004=$218/$531,200). Given there are 172 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $17K and $38K, respectively. In the southern nearshore area, there is no additional cost to the lobster fleet under the PA plan.

In the Mid-Atlantic (southern nearshore and southern offshore area) under the PA plan the cost per vessel is $657 to attach weak links at the top of the buoy line, in the middle of each 50 fathom net panel, and to purchase a 22 pound danforth anchor (Table 5.1.2.4). The total industry cost is $98.6K. The cost of the PA plan would reduce a vessel's annual revenue by 0.7% (0.007=$657/$89,000).

Table 5.1.2.3 Summary of average lower bound (LB) and upper bound (UB) cost per vessel and total industry costs within the lobster fleet under the 2001 PA plan by area.

Vessel ($1)		
Weak Link on Buoy Line		
	LB	UB
N.Inshore	139	648
N.Offshore	97	218
S.Nearshore	0	0
Industry ($1000s)		
Weak Link on Buoy Line		
	LB	UB
N.Inshore	832	3,877
N.Offshore	17	38
S.Nearshore	0	0
Total	849	3,915

Table 5.1.2.4 Summary of the average cost per vessel and total industry costs within the sink gillnet fishery under the 2001 PA plan by area

PA ($1)		
Requirements	Vessel	Industry
Weak Link on Buoy Line	23	10,395
Weak Link on Net Panel	65	28,031
Anchor[1]	570	60,150
Total	657	98,577

5.1.3 Social Impacts

The economic analysis demonstrates the fishing community will be impacted by this alternative. Further gear modifications may drive marginal operators out of the fishing industry and have a net negative impact on fishing communities. The proposed action does not prohibit fishing entirely but places additional restrictions on the practices.

Social benefits may be realized if these gear modifications are effective at reducing the risk to North Atlantic right whales, and other marine mammals and sea turtles, of entanglement. If this reduced risk increases the potential for recovery then society will benefit by preventing a loss of a species and preserving biodiversity. While these gear restrictions places an economic burden on the fishing community, they do not prohibit fishing all together. Social benefits are realized from the application of management practices that demonstrate that fishing practices and marine mammals can co-exist.

5.2 NO ACTION ALTERNATIVE

The No Action alternative would leave in place the existing regulations from the 1997 interim final rule, 1999 final rule and the 2000 interim final rule. All lobster and gillnet fisheries, regardless of area, are required to comply with universal requirements which include no floating line at the surface and no wet storage of gear. Lobster trap fisheries in the Offshore Lobster Waters are required to utilize a weak link with a maximum breaking strength of 3780 lb (1714 kg)and the weak link is required to leave a clean bitter end, free of any knots when parted. Lobster trap fisheries in the Southern Nearshore Lobster Waters Area are required to implement at least one option from the Lobster Take Reduction Technology List shown below.

Lobster Take Reduction Technology List

1. All buoy lines must be 7/16 inches (1.11 cm) or less in diameter.
2. All buoys must be attached to the buoy line by a weak link with a maximum breaking strength of 600 lbs (272.4 kg)that breaks clean and free of knots
3. All buoy line composed entirely of sinking line.
4. All ground lines composed entirely of sinking line.

Gillnet fisheries in the Mid-Atlantic Coastal waters Area are required to comply with the universal requirements as discussed above and at least one of the characteristic from the Gillnet Take Reduction Technology List shown below.

Gillnet Take Reduction Technology List

1. All buoy lines must be 7/16 inches (1.11 cm) or less in diameter.
2. All buoys must be attached to the buoy line by a weak link with a maximum breaking strength of 1100 lbs (498.8 kg)that breaks clean and free of knots
3. Weak links with a maximum breaking strength of 1100 lbs (498.8 kg) are installed in the float rope *between* panels.
4. All buoy line composed entirely of sinking line.

The lobster and gillnet take reduction technology lists contain elements which are a suite of options a fisherman can employ to reduce risk of entanglement. The conservation benefit of options such as the 7/16 inch (1.11 cm) or less diameter line are now considered of limited value. Serious injury and mortality has continued to occur and the multiple options approach, versus required modifications, does not provide adequate entanglement risk reduction.

5.2.1 Biological Impacts

The lobster and gillnet take reduction technology lists contain measures which are a suite of options from which a fisherman must choose to reduce the risk of entanglement. The conservation benefit of options such as the 7/16 inch (1.11 cm) or less diameter line are now considered of limited value. Serious injury and mortality has continued to occur and the multiple options approach, versus required modifications such as weak links, does not provide adequate entanglement risk reduction. This conclusion is supported in the jeopardy finding of the BOs. The BOs concluded that proposed gillnet and lobster trap fisheries under the four fisheries as currently implemented, the no action alternative, are likely to jeopardize the continued existence of the North Atlantic right whale.

5.2.2 Economic Impacts

Effectiveness of the RPA in avoiding jeopardy is of obvious benefit to the North Atlantic right whale, but it is also of benefit to the continued operation of the fisheries. The fisheries would experience no immediate expenses for gear modification under the no action alternative. However, if the RPA is not implemented or successful at avoiding jeopardy after implementation then additional more stringent measures must be adopted which would likely have greater economic impacts on the commercial fishing industry, including the potential cessation of fishing.

5.2.3 Social Impacts

Under the No-Action alternative fishing practices are not further restricted and therefore, at least in the short term, impacts to employment, family and community are minimized. If, however, the failure to take action now to minimize impacts on North Atlantic right whales results in the need to take more aggressive action at a later date the consequences to employment, family and community would be greatly increased from that described under the preferred action alternative.

If the failure to take action results in an increased risk of extinction of the North Atlantic right whale then there are social impacts associated with the failure to take action. The extinction of the North Atlantic right whale would be a loss to society which has placed a value on the protection of all species for its intrinsic value as well as for its contribution to biodiversity. By failing to take action the Secretary of Commerce would not be carrying out responsibilities imposed on him by society in the ESA which require him to ensure that all actions he authorizes, such as commercial fishing, are not likely to jeopardize the continued existence of threatened and endangered species.

5.3 FULL WEAK LINKS AND FLOATING LINE REDUCTION ALTERNATIVE

The Full Weak Links and Floating Line Reduction Alternative would combine the Proposed Action requirements for weak links at the surface of fixed gear with requirements for bottom weak links and the reduction of floating line.

Bottom weak links were identified by the ALWTRT as an additional method to reduce the likelihood of large whales becoming entangled in significant amounts of gear that would increase the threat of serious injury or death from the entanglement. Animals encountering floating line near the bottom may become entangled in the working gear before the weak link at the buoy can break away to facilitate the animal’s release. However, weak links at the bottom of the buoy line make it difficult, though not impossible, to haul the gear safely without the weak link failing and resulting in lost gear. The NMFS gear research effort has identified several bottom weak link concepts that are being tested, but have not yet been developed to be operationally viable. This is included as an alternative based on the fact that it would remove vertical lines from the water column.

Floating line can become an entanglement threat when groundline running between traps in lobster trawls or gillnet anchor line floats up off the bottom causing buoyant arcs of line to be suspended in the water column. The NMFS gear research program has investigated the use of sinking line in trawl groundline and gillnet anchorline. Although sinking line can be used in soft or smooth bottom areas, it chafes or abrades in hard rock or cobble bottom, and quickly weakens resulting in an increased risk of breakage. Neutrally buoyant line presents an alternate technological approach to the reduction of floating groundline and anchorline. The NMFS gear research team has over 60 miles of various diameter, neutrally buoyant line deployed with the fishing industry. Industry response to neutrally buoyant line indicates this risk reduction tool has utility in areas beyond those using sinking line. Some industry representatives have expressed concern with the utility of the line in certain bottom types such as hard-rocky bottoms as well as the wide spread commercial availability of the line. The industry advanced several recommendations for the potential use of neutrally buoyant line at the June 2001 ALWTRT meeting. NMFS is currently pursuing the complete changeover of existing line to neutrally buoyant line on a single offshore lobster vessel. This action is to address the true costs, required time to change over and other operational problems associated with the full utilization of non floating line. Manufacturing issues which may arise should this technology be used as a widespread risk reduction tool are also expected to be addressed.

5.3.1 Biological Impacts

The biological impacts of additional weak links and the reduction of floating line in the water column appear promising at first glance. However, the operational impacts of the bottom weak link may be large for the fishermen and result in negative impacts on the North Atlantic right whale. The ability to haul back gear successfully while employing a bottom weak link has not been developed and the potential for gear loss is considered high at this point. Gear left on the bottom without surface representation, such as a buoy or high flyer, is difficult to recover and becomes ghost gear which continues to fish and still presents an entanglement risk to the North Atlantic right whale.

5.3.2 Economic impacts of the Non-Preferred Alternative 1 (NPA 1)

Under the NPA 1 plan, vessels fishing lobster gear are required to make 3 gear changes which include: 1) all items under the PA plan; 2) attaching a weak link at the bottom of the buoy line; and 3) replacing buoy and ground lines with either sinking or neutrally buoyant line. Vessels fishing sink gillnet gear have the same gear changes as those fishing lobster gear, however, they only replace buoy and anchor lines with sinking or neutrally buoyant line.

A thwartable weak link at a unit cost of $25 will be used as the bottom weak link for both fisheries in all areas, and we assume the labor time is 10 minutes per unit. Vessels fishing offshore typically use 11/16" rope for ground and buoy lines, and 3/8" is used in all other areas. The unit cost of 11/16" line for neutrally buoyant and sinking line is $0.225 and $0.281 per foot, respectively. We take the average of these two lines at $0.253 per foot, since it is unknown as to which line an individual will choose. Similarly, the average unit cost of 3/8" sinking and neutrally buoyant line per foot is $0.0675. We assume it takes 10 minutes of labor to attach the buoy to the buoy line, and 2 minutes of labor to measure out each 100 feet of line. A hourly labor rate of $14.05 based on the U.S. Bureau of Labor is assumed.

In this section the 3 lobster fleet areas will be presented together because the calculations are the same for each area. The same approach will follow for the mid-Atlantic sink gillnet fishery. The section will end with a summary of all gear changes for both fleets in all areas.

5.3.2.1 Lobster Fleet

PA plan
A detail explanation of these costs can be found in Section 5.1.2.1 with a summary in Section 5.1.2.3.

Weak Link at the bottom of the buoy line
The cost of attaching a thwartable weak link on the bottom of the buoy line is estimated here. In the northern inshore area, we assume as a lower bound estimate vessels fish 60 pair trawls and 8 trawls of 15 traps. Average material cost for the pair trawls and 15 trap trawls are $1,500 (1500=1 buoy line per trawl * 60 trawls *$25 per unit) and 400 (400= 2 buoy lines per trawl * 8 trawls*$25 per unit), respectively. Average labor costs for the pair trawls and 15 trap trawls are $141 (140.5=1 buoy line per trawl*60 trawls * (10/60) minutes per weak link * $14.05 per hour), and $37 (37 = 2 buoy lines per trawl*8 trawls*(10/60) minutes per weak link*$14.05), respectively. The average lower bound cost per vessel to use thwartable weak links on the bottom of the buoy line is $2,078 (2078=1500+400+141+37). Given there are 5,982 vessels potentially fishing lobster gear in the northern nearshore area, the total lower bound industry cost is $12.4M (=5,982 vessels*$2,078 per vessel). With similar calculations, the average upper bound cost per vessel and total industry costs for the northern inshore area are $6,927 and $41.4M, respectively. Using similar calculations estimates are made for the northern offshore area and southern nearshore area.

In the northern offshore area, the average lower and upper bound cost per vessel of attaching a thwartable weak link at the bottom of the buoy line are $1,167 and $2,461, respectively. This assumes vessels are fishing a lower and upper bound estimate of 21.4 and 45 trawls, respectively, that consist of 40 traps per trawl. Given there are 172 vessels in the northern offshore area, the total lower and upper bound industry cost is $0.2M and $0.4M, respectively.

In the southern nearshore area, the average lower and upper bound cost per vessel of attaching a thwartable weak link at the bottom of the buoy line $926 and $2,916, respectively. This assumes vessels are fishing a lower and upper bound estimate of 16.9 and 53.3 trawls, respectively, that consist of 15 traps per trawl. Given there are 222 vessels in the southern nearshore area, the total lower and upper bound industry cost is $0.2M and $0.7M, respectively.

Replace buoy and ground lines with sinking or neutrally buoyant line
We assume vessels fishing in the northern inshore area have 120 feet of line between each trap, and therefore the length of the ground line for one trawl consisting of 15 traps is 71,800 feet long. We also assume as a lower bound estimate vessels fish 60 pair trawls and 8 trawls of 15 traps.

In the northern inshore area, the average lower bound material cost for a vessel to replace 3/8" ground lines with neutrally buoyant or sinking line for pair trawls and 15 trap trawls are $1,944 ($1,944=120 feet per trap*(60 trawls*2 traps + 8 trawls*15 traps)* $0.0675 per foot). Average labor cost per vessel for installing these ground lines is $135 ($135 = 120 feet per trap*(60 trawls*2 traps + 8 trawls*15 traps) * (2/60 hours per 100 feet of measuring)*$14.05 per hour/100 feet). The average lower bound cost of replacing the ground lines with neutrally buoyant or sinking line per vessel is $2,079 ($2079=$1,944 + $135). Given there are 5,982 vessels potentially fishing lobster gear in the northern inshore area, the total lower bound industry cost is $12.4M ($12.5M=5,982 vessels*$2,079 per vessel). With similar calculations, the average upper bound cost per vessel and total industry cost of replacing these ground lines in the northern inshore area is $6,930 and $41.5M, respectively (Table 5.3.2.1).

NEFSC observer data show vessels in the northern inshore area fish at depths of 100 feet on average. The average lower bound material cost for a vessel to replace the 3/8" buoy line in the northern inshore area is $770 ($770 = (60 trawls*1 buoy line + 8 trawls*2 buoy lines)*(100 feet depth*1.5 slack per buoy line)*$0.0675 per foot). The average lower bound labor cost is $231 ($231 =(60 trawls*1 buoy line + 8 trawls*2 buoy lines)*(100 feet depth*1.5 slack per buoy line)*(10/60 hours to attach buoy line + 2/(60*100) hours per 100 feet of measuring) *$14.05 per hour). A vessel’s average total lower bound cost of replacing the buoy line is $1,001 ($1,001=$770 materials + $231 labor). The total lower bound industry cost for replacing this buoy line is $6.0M ($6.0M = 5,982 vessels * $1,001 cost per vessel). The average upper bound cost per vessel and total industry costs of replacing the buoy line are $3,336 and $20M, respectively. With similar calculations we can estimate the cost of replacing the buoy and ground lines for the northern offshore and southern nearshore area.

In the northern offshore area the average lower and upper bound cost per vessel to replace their 11/16" ground lines with neutrally buoyant or sinking line is $41,552 and $87,581, respectively. We assume vessels fishing offshore have 180 feet of line between each trap, and therefore the length of the ground line for one trawl consisting of 40 traps is 7,200 feet long. We assume further that the lower bound and upper bound estimate of trawls fished is 21.4 and 45 trawls, respectively. Given there are 172 vessels potentially fishing lobster gear in the northern offshore area, the total lower and upper bound industry costs for replacing the ground line is $7.2M ($7.2M = 172*$41,555 cost per vessel) and $15.1M, respectively.

In the northern offshore area, the average lower and upper bound cost per vessel to replace their 11/16" buoy lines with neutrally buoyant or sinking line is $7,396 and $15,589, respectively. NEFSC observer data show vessels in the northern offshore area fish at depths of 419 feet on average. The total lower and upper bound industry cost to replace the buoy lines in the northern offshore area is $1.3M ($1.3M=172 vessels*$7,396 cost per vessel) and $2.7M, respectively.

In the southern nearshore area the average lower and upper bound cost per vessel to replace their 3/8" ground lines with neutrally buoyant or sinking line is $2,200 and $6,930, respectively. We assume vessels fishing offshore have 120 feet of line between each trap, and therefore the length of the ground line for one trawl consisting of 15 traps is 1,800 feet long. We assume further that the lower bound and upper bound estimate of trawls fished is 16.9 and 53.3 trawls, respectively. Given there are 222 vessels potentially fishing lobster gear in the northern offshore area, the total lower and upper bound industry costs for replacing the ground line is $0.5M and $1.5M, respectively.

In the southern nearshore area, the average lower and upper bound cost per vessel to replace their 3/8" buoy lines with neutrally buoyant or sinking line is $285 and $897, respectively. NEFSC observer data show vessels in the northern offshore area fish at depths of 56 feet on average. The total lower and upper bound industry cost to replace the buoy lines in the northern offshore area is $0.1M and $0.2M, respectively.

Table 5.3.2.1. Total lower bound (LB) and upper bound (UB) cost per vessel and industry cost in the lobster fishery to replace the buoy and ground lines with either neutrally buoyant or sinking line which includes materials and labor by area.

Neutrally Buoyant or Sinking Line on Buoy Line ($1)								
	LB				UB			
	Vessel			Industry	Vessel			Industry
	Material	Labor	Total	Total	Material	Labor	Total	Total
N.Inshore	770	231	1,001	5,987,125	2,565	771	3,336	19,957,082
N.Offshore	7,171	226	7,396	1,272,142	15,113	476	15,589	2,681,329
S.Nearshore	192	93	285	63,193	605	292	897	199,032
Industry Total				7,322,460				22,837,443
Neutrally Buoyant or Sinking Line on Ground Line ($1)								
	LB				UB			
	Vessel			Industry	Vessel			Industry
	Material	Labor	Total	Total	Material	Labor	Total	Total
N.Inshore	1,944	135	2,079	12,435,860	6,480	450	6,930	41,452,867
N.Offshore	41,072	480	41,552	7,146,946	86,569	1,012	87,581	15,063,820
S.Nearshore	2,057	143	2,200	488,433	6,480	450	6,930	1,538,371
Industry Total				20,071,239				58,055,058

5.3.2.2 Sink Gillnet Fleet
In the mid-Atlantic there are 457 vessels potentially fishing sink gillnet gear who do not return to port with their gear. Based on an earlier analysis (Bisack 2000) approximately 78 percent or 357 vessels fish in the southern nearshore area, and the remaining 100 sink gillnet vessels fish in the southern offshore area. NEFSC observer data show southern nearshore vessels fish 4.7 strings at a depth of 56 feet, and in the southern offshore area, data show vessels fish 10 strings at a depth of 336 feet on average.

PA plan
A detail explanation of these costs can be found in Section 5.1.2.2 with a summary in Section 5.1.2.3.

Weak Link at the bottom of the buoy line
The cost of attaching a thwartable weak link on the bottom of the buoy line is estimated here. In the southern nearshore area the material cost per vessel to attach a weak link at the bottom of the buoy line is $235 ($235 = 4.7 strings*2 buoy lines per string * $25). Labor cost to attach the buoy line is $22 ($22 = 4.7 strings*2 buoy lines per string*(10/60) hours to attach each buoy line *$14.05 per hour). Therefore the total cost per vessel to attach a thwartable weak link at the bottom of each buoy line is $257 ($257 = $235 materials + $22 labor). Given there are 357 vessels potentially fishing sink gillnet gear in the mid-Atlantic, the total industry cost to attach this weak link is $91.8K ($91.8K = 357 vessels * $257 cost per vessel).

In the southern offshore area the average material cost per vessel to attach a weak link at the bottom of the buoy line is $500 ($500 = 10 strings*2 buoy lines per string * $25). Average labor cost to attach the buoy line is $47 ($47 = 10 strings*2 buoy lines per string*(10/60) hours to attach each buoy line *$14.05 per hour). Therefore the total average cost per vessel to attach a thwartable weak link at the bottom of each buoy line is $547 ($547 = $500 materials + $47 labor). Given there are 100 vessels potentially fishing sink gillnet gear in the mid-Atlantic, the total industry cost to attach this weak link is $54.7K ($54.7K = 100 vessels * $547 cost per vessel).

To replace buoy and anchor lines with sinking or neutrally buoyant line in the southern nearshore area, the average material cost for a vessel to replace their 3/8" buoy lines with neutrally buoyant or sinking line is $53 ($53 = 4.7 strings*2 buoy lines per string*56 feet * 1.5 slack*$0.0675 per foot). The average labor cost to replace the buoy line is $25 ($25 = (4.7 strings*2 buoy lines per string)*(56 feet of depth*1.5 slack per buoy line)*(10/60 hours to attach buoy line + 2/(60*100) hours per 100 feet of measuring) *$14.05 per hour). The total average cost to replace the buoy line per vessel is $78 ($78 = $53 materials + $25 labor). Given there are 357 vessels potentially fishing sink gillnet gear in the southern nearshore area, the cost of replacing the buoy line to the industry is $27.8K ($27.8K = 357 vessels * $78 per vessel).

The average material cost per vessel to replace their 3/8" anchor line in the southern nearshore area is $16 ($16 = 4.7 strings*2 buoy lines per string*25 feet per anchor line*$0.0675 per foot). The average labor cost is $1 ($1 = (4.7 strings*2 buoy lines per string)*(25 feet per anchor line)*(2/(60*100) hours per 100 feet of measuring) *$14.05 per hour). The total average cost per vessel is $17 ($17 = $16 materials + $1 labor). Therefore the total industry cost to replace the anchor line with neutrally buoyant or sinking line is $6.1K ($6.1K = 357 vessels * $17).

In the southern offshore area, the average material cost for a vessel to replace their 11/16" buoy lines with neutrally buoyant or sinking line is $2,552 ($2,552 = 10 strings*2 buoy lines per string*336 feet * 1.5 slack*$0.253 per foot). The average labor cost to replace the buoy line is $78 ($78 = (10 strings*2 buoy lines per string)*(336 feet of depth*1.5 slack per buoy line)*(10/60 hours to attach buoy line + 2/(60*100) hours per 100 feet of measuring) *$14.05 per hour). The total average cost to replace the buoy line per vessel is $2,630 ($ 2,630= $2,552 materials + $78 labor). Given there are 100 vessels potentially fishing sink gillnet gear in the southern nearshore area, the cost of replacing the buoy line to the industry is $263.0K ($263.0K = 100 vessels * $2,630 cost per vessel).

The average material cost per vessel to replace their 3/8" anchor line in the southern offshore area is $506 ($506 = 10 strings*2 buoy lines per string*100 feet per anchor line*$0.253 per foot). The average labor cost is $9 ($9 = (10 strings*2 buoy lines per string)*(100 feet per anchor line)*(2/(60*100) hours per 100 feet of measuring) *$14.05 per hour). The total average cost per vessel is $515 ($515 = $506 materials + $9 labor). Therefore the total industry cost to replace the anchor line with neutrally buoyant or sinking line is $51.5K ($51.5K = 100 vessels * $515 cost per vessel).

5.3.2.3 Summary of NPA 1 plan

Lobster Fleet

In the northern inshore area, the total lower and upper bound average cost per vessel in the lobster fleet under the NPA 1 plan is $5,297 and $17,841, respectively (Table 5.3.2.2). The cost of this plan would reduce a vessel’s annual revenue between 3.8% (0.038=$5,297/$140,900) and 12.7% (0.127=$17,841/$140,900). Given there are 5,982 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $31.7M and $106.8M, respectively.

In the northern offshore area, the total lower and upper bound average cost per vessel in the lobster fleet under the NPA 1 plan is $50,212 and $105,849, respectively. The cost of this plan would reduce a vessel’s annual revenue between 9.5% (0.095=$50,212/$531,200) and 19.9% (0.199=$105,849/$531,200). Given there are 172 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $8.6M and $18.2M, respectively.

In the southern nearshore area, the total lower and upper bound average cost per vessel in the lobster fleet under the NPA 1 plan is $3,411 and $10,743, respectively. The cost of this plan would reduce a vessel’s annual revenue between 3.2% (0.032=$3,411/$105,600) and 10.2% (0.102=$10,743/$105,600). Given there are 222 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $0.8M and $2.4M, respectively.

Sink Gillnet Fleet

In the southern nearshore area, the average cost per vessel in the sink fleet under the NPA 1 plan is $1,009 if an anchor is required and $440 if an anchor is not required under the PA plan (Table 5.3.2.3). Given there are 357 vessels potentially fishing sink gillnet gear, the total industry cost is $225K (Table 5.3.2.3). In the southern offshore area, the total cost per vessel in the sink fleet under the NPA 1 plan is $4,349 if an anchor is required and $3,780 if an anchor is not required under the PA plan. The cost of this plan would reduce a vessel’s annual revenue by 4.6% (0.046=($4,349+$3,780)2/$89,000). Given there are 100 vessels potentially fishing sink gillnet gear, the total industry cost is $469K (Table 5.3.2.3). In the mid-atlantic, the total industry cost for the NPA 1 plan is $694K.

Table 5.3.2.2 Summary of the average lower bound (LB) and upper bound (UB) cost per vessel and total industry costs to the lobster fleet for the 2001 NPA 1 plan by area. Notation: BL(replacement of buoy line), GL (replacement of ground line), WL on B (weak link on buoy line).

Vessel ($1)										
	PA		BL		GL		WL on B		Total	
	LB	UB	LB	UB	LB	UB	LB	UB	LB	UB
N.Inshore	139	648	1,001	3,336	2,079	6,930	2,078	6,927	5,297	17,841
N.Offshore	97	218	7,396	15,589	41,552	87,581	1,167	2,461	50,212	105,849
S.Nearshore			285	897	2,200	6,930	926	2,916	3,411	10,743
Industry ($1000s)										
	PA		BL		GL		WL on B		Total	
	LB	UB	LB	UB	LB	UB	LB	UB	LB	UB
N.Inshore	800	3,900	5,987	19,957	12,436	41,453	12,430	41,435	31,653	106,745
N.Offshore	17	38	1,272	2,681	7,147	15,064	201	423	8,637	18,206
S.Nearshore			63	199	488	1,538	206	648	757	2,385
Total									41,750	127,336

Table 5.3.2.3 Summary of the average cost per vessel and total industry costs to the sink gillnet fleet for the 2001 NPA 1 plan by area. Notation: BL(replacement of buoy line), AL (replacement of anchor line), WL on B (weak link on buoy line).

Vessel ($1)						
Mid-Atlantic	PA		BL	AL	WL on B	Total
S. Nearshore	No Anchor	88	78	17	257	440
	Anchor	657	78	17	257	1,009
S.Offshore	No Anchor	88	2,630	515	547	3,780
	Anchor	657	2,630	515	547	4,349
Industry ($1000s)						
Mid-Atlantic		PA	BL	AL	WL on B	Total
S. Nearshore		99	28	6	92	225
S. Offshore		99	263	52	55	469
Total						694

5.3.3 Social Impacts

The societal impacts of additional weak links and non floating line do not appear to be significant. The bulk of the impact of this alternative would be economic resulting from increased gear costs. The potential for negative societal impacts does exist if this alternative were employed and the operational concerns and ghost gear concerns come to pass. The potential for gear loss increases the cost of fishing, resulting in a negative impact on the fishing community, and the potential for increased ghost gear results in the increased entanglement risk, resulting in a negative impact on society's desire to preserve the North Atlantic right whale.

5.4 BUOY LINE REMOVAL AND FLOATING LINE REDUCTION ALTERNATIVE

The Buoy Line Removal and Floating Line Reduction Alternative would eliminate the need for weak links at the surface and bottom while maximizing the reduction of fixed gear in the water column.

Complete removal of buoy line and reduction of floating line is recognized as the most risk averse technique for utilization of fixed gear.

One of the major drawbacks to removal of buoy lines is that other fishermen will not know where gear has been set, and gear conflicts with both fixed and mobile gear are likely to result in lost and/or damaged gear possibly resulting in an increase in ghost gear. Therefore, this option may only be feasible in areas where other gear cannot be set or can be strictly controlled.

5.4.1 Biological Impacts

The biological benefits to the North Atlantic right whale and other species at risk of entanglement brought about by the removal of vertical lines from the water column is thought to be the most risk averse option and therefore of the greatest biological benefit. The lack of surface representation, a buoy or other marker, may lead to gear conflicts between the fixed and mobile fishing gear communities. These conflicts may result in lost or damaged gear and the potential for ghost gear, as an entanglement source, remains important to the biological impact review. This problem remains an issue for both the acoustic release and corrodible link option.

5.4.2 Economic impacts of the (NPA 2)

Under the NPA 2 plan, vessels fishing lobster gear are required to make 2 gear changes which include: 1) replacing all existing buoy lines with an acoustical release buoy line and; 2) replacing ground lines with either sinking or neutrally buoyant line. Vessels fishing sink gillnet gear have the same gear changes as those fishing lobster gear, however, they replace anchor lines with sinking or neutrally buoyant line.

An acoustical release buoy line has a unit cost of $2,000. In addition to replacing the line, a vessel must purchase a device which triggers the release of the buoy line on the bottom for a one time fixed cost of $4,000. Only material costs are estimated here since it is unknown as to how long it would require a vessel to become fully operational with the acoustic buoy line, plus we expect the labor cost to be insignificant compared to the material cost.

In this section the 3 lobster fleet areas will be presented together because the calculations are the same for each area. The same approach will follow for the mid-Atlantic sink gillnet fishery. The section will end with a summary of all gear changes for both fleets in all areas.

5.4.2.1 Lobster Fleet

Acoustical release buoy line

In the northern inshore area, the lower bound average material cost for a vessel to replace the existing buoy lines with acoustical lines for pair trawls and 15 trap trawls are $156K ($156K = (60 trawls*1 buoy line + 8 trawls*2 buoy lines)*$2,000) + $4,000 retrieving device). Given there are 5,982 vessels potentially fishing lobster gear in the northern inshore area, the total lower bound industry cost is $933M.($933M = 5,982 vessels * $156K cost per vessel). The upper bound cost per vessel and industry cost is $511K and $3,055M, respectively. Using similar calculations we can estimate the cost for the northern offshore and southern nearshore area.

In the northern offshore area, the lower and upper bound material cost for a vessel to replace their existing buoy lines with acoustical lines is $89K and $184K, respectively. Given there are 172 vessels potentially fishing lobster gear in this area the total lower and upper bound industry cost is $15M and $32M, respectively.

In the southern nearshore area, the lower and upper bound material cost for a vessel to replace their existing buoy lines with acoustical lines is $72K and $217K, respectively. Given there are 222 vessels potentially fishing lobster gear in this area the total lower and upper bound industry cost is $16M and $48M, respectively.

Neutrally buoyant or sinking line on ground lines
These costs are the same as those presented under the NPA 1 plan. For details see Section 5.3.2.1

5.4.2.2 Sink Gillnet Fleet
Acoustical release buoy line
In the southern nearshore area, the average material cost per vessel to replace the existing buoy lines with acoustical buoy lines is $22.8K ($22.8K = 4.7 strings * 2 buoy lines per string * $2,000 per acoustical buoy line + $4,000 per retrieving device). Given there are 357 vessels potentially fishing sink gillnet gear in the southern nearshore area the total industry cost is $8.1M ($8.1M = 357 vessels *$22.8K).

In the southern offshore area, the average material cost per vessel to replace the existing buoy lines with acoustical buoy lines is $44.0K ($44.0K = 10 strings * 2 buoy lines per string * $2,000 per acoustical buoy line + $4,000 per retrieving device). Given there are 100 vessels potentially fishing sink gillnet gear in the southern nearshore area the total industry cost is $4.4M ($4.4M = 100 vessels *$44.0K).

Neutrally buoyant or sinking line on ground lines
These costs are the same as those presented under the NPA 1 plan. For details see Section 5.3.2.2

5.4.2.3 Summary of NPA 2 plan
Lobster Fleet
In the northern inshore area, the average lower and upper bound cost per vessel in the lobster fleet under the NPA 2 plan is $158.9K and $517.6K, respectively (Table 5.4.2.1). Since the average vessel's annual revenue is less than the cost of this plan ($140.9K on average), we expect vessels to exit under this plan. Given there are 5,982 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $945.6M and $3,096.2M, respectively.

In the northern offshore area, the average lower and upper bound cost per vessel in the lobster fleet under the NPA 2 plan is $131.0K and $271.6K, respectively. The cost of this plan would reduce a vessel's annual revenue between 24.7% (0.247=$131,000/$531,200) and 51.1% (0.511=$271,600/$531,200). Given there are 172 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $22.5M and $46.7M, respectively.

In the southern nearshore area, the average lower and upper bound cost per vessel in the lobster fleet under the NPA 2 plan is $73.9K and $224.3K, respectively. Since the lower bound cost of this plan is 70% of a vessel's annual revenue($105.6K on average) and the upper bound cost is greater than their annual revenue, we expect vessels to exit this fishery under this plan. However, they may hold permits in other fisheries and continue to operate. Given there are 222 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $16.4M and $49.8M, respectively.

Sink Gillnet

In the southern nearshore area, the average cost per vessel in the sink fleet under the NPA 2 plan is $22.8K (Table 5.4.2.2). The cost of this plan would reduce a vessel's annual revenue by 25.6% (0.256=$22,800/$89,000). Given there are 357 vessels potentially fishing sink gillnet gear, the total industry cost is $8.1M. In the southern offshore area, the average cost per vessel in the sink fleet under the NPA 2 plan is $44.5K. Given there are 100 vessels potentially fishing sink gillnet gear, the total industry cost is $44.5M.

Table 5.4.2.1 Summary of the average cost per vessel and total industry costs to the lobster fleet for the 2001 NPA 2 plan by area. Notation: GL (replacement of ground line).

Vessel ($1)						
	GL		Acoustic Device		Total	
	LB	UB	LB	UB	LB	UB
N.Inshore	2,079	6,930	156,000	510,667	158,079	517,597
N.Offshore	41,552	87,581	89,400	184,000	130,952	271,581
S.Nearshore	2,200	6,930	71,733	217,333	73,933	224,263
Industry ($1000s)						
	GL		Acoustic Device		Total	
	LB	UB	LB	UB	LB	UB
N.Inshore	12,436	41,453	933,192	3,054,808	945,628	3,096,261
N.Offshore	7,147	15,064	15,377	31,648	22,524	46,712
S.Nearshore	488	1,538	15,925	48,248	16,413	49,786
Total					984,565	3,192,759

Table 5.4.2.2 Summary of the average cost per vessel and total industry costs to the sink gillnet fleet for the 2001 NPA 2 plan by area. Notation: AL (replacement of anchor line), AD (acoustic device).

Vessel ($1)			
Mid-Atlantic	AL	AD	Total
Nearshore	17	22,800	22,817
Offshore	516	44,000	44,516
Industry ($1000s)			
Mid-Atlantic	AL	AD	Total
Nearshore	6	8,140	8,146
Offshore	52	4,400	4,452
Total			12,598

5.4.3 Social Impacts

The societal impacts of buoy line removal and floating line reduction does not appear to be significant. The bulk of the impact of this alternative would be economic resulting from increased gear costs. The potential for negative societal impacts does exist if this alternative were employed and the operational concerns and ghost gear concerns come to pass. The potential for gear loss increases the cost of fishing, resulting in a negative impact on the fishing community, and the potential for increased ghost gear results in the increased entanglement risk, resulting in a negative impact on society’s desire to preserve the North Atlantic right whale.

6.0 CUMULATIVE IMPACTS

This section estimates the cumulative effects of several PA plans that have been proposed or implemented with the intention of protecting right whales. Two types of plans exist. First, gear modifications have been proposed or required under 3 PA plans (NMFS 1997; NMFS 2000; 2001 PA presented here). One gear modification requires a weak link to be attached at the top of the buoy line, where the weak link has a designated breaking strength. The objective is to allow a right whale to break through a lobster or sink gillnet buoy line if there is an encounter, and therefore prevent an entanglement. Unfortunately, with the gear modifications under all these PA plans, the risk of entanglement may not be completely removed. Dynamic Area Management (DAM) closures have been implement in 2001 as a second type of plan, and is analyzed elsewhere. Specifically, a sighting of 3 right whales at a density of 0.04 right whales per square nautical mile, will trigger a closure to all lobster and sink gillnet gear under this 2001 PA plan. Removal of all gear will remove all the risk of an entanglement with lobster and sink gillnet gear. The objective of gear modifications when DAM is operational, is the gear modifications in the PA plans (1997, 2000, 2001) will reduce the risk of entanglement in cases where DAM is not active or right whales are outside of existing closures (such as Cape Cod Bay Critical Habitat and the Great South Channel Critical Habitat).

Decreasing the risk of right whale entanglements under these four PA plans, have an increasing cumulative cost to the lobster and sink gillnet fleet. The total lower bound industry cost to the lobster and sink gillnet fleet for the gear modifications under the 1997, 2000 and 2001 PA plan are $129.3K, $300K, and $948K, respectively (Table 6.1). A substantial increase in cost for gear modifications exists in the 2001 PA plan compared to earlier plans, as a result of the northern inshore lobster fishery requiring gear modifications for the first time, which consists of 5,982 vessels potentially fishing lobster gear. Similarly the total upper bound industry costs are $276.3K, $648K, and $4,014K for gear modifications under the 1997, 2000, and 2001 PA plan. The cost of the 2001 DAM PA plan is $5,847K.

The total lower and upper bound cumulative industry costs to the lobster fishery for these four PA plans are $4,337K and $7,898K, respectively. Similarly, the total cost to the sink gillnet fleet is $2,887K.

Table 6.1 Total lower and upper bound industry costs of gear modifications under the 1997, 2000 and 2001 PA plan under the ALWTRP, and the cost of DAM under the 2001 PA plan incurred to the lobster and sink gillnet fleet.

Fleets		Cost of PA Plans ($1,000s)				
		Gear EA			DAM EA	Cumulative Total
		1997	2000	2001	2001	
Lobster	LB	129.0	191	849	3,168	4,337
	UB	276.0	539	3,915	3,168	7,898
Gillnet	Pt	0.3	109	99	2,679	2,887
Total	LB	129.3	300	948	5,847	7,224
	UB	276.3	648	4,014	5,847	10,785

7.0 FINDING OF NO SIGNIFICANT IMPACT

Impacts to society, both beneficial and adverse, were evaluated in this document and were determined to not be significant. Implementation of gear modifications, as described in this document, are expected to have a short-term negative economic impact on the fishing industry. Gear modifications are expected to have positive effects on right whales by reducing serious injury and mortality in the event of an entanglement. The impact of gear modifications alone, however, is not significant enough to avoid the likelihood of jeopardy.

Public health and safety is not expect to be significantly affected by implementation of these gear modifications. The fishing industry has been instrumental in defining acceptable gear modifications largely in the interest of safety. Given the fact that these modifications were developed in cooperation with industry, state governments, academia and other federal agencies, with safety as a major consideration, public health and safety are not expected to be affected.

The unique characteristic of the geographic area impacted by the rule is the fact that all of this area is ocean floor which supports an abundance of life forms of commercial and non-commercial value. The value of this area was considered in the essential fish habitat consultation process and the unique characteristics will be not be impacted by this proposed action.

The effects on the human environment of gear modifications are not likely to be highly controversial. The impact of gear modifications may be controversial to a small segment of the fishing community, but the overall effects on the human environment are not expected to be highly controversial. These gear modifications are limited in geographic area and are implemented in an effort to facilitate the coexistence of fishing activity and whales. These factors restrict the scope of the effects on the human environment.

The degree to which the effects of gear modifications are highly uncertain or involve unique or unknown risks is small to non existent. Similar gear modifications are in existence in other similar fisheries in other geographic areas and the degree of certainty that these modifications will work properly is quite high. The likelihood of unknown risks is low to non existent given fact these modifications are in place in other geographic areas and no unknown risks have been identified.

There is no evidence that implementation of gear modifications as a management tool to reduce the risk of entanglement to right whales establishes a precedent for future actions with significant effects or represents a decision in principle about a future consideration. The justification for these gear modifications can be found in the BOs drafted for the multispecies, monkfish, dogfish and lobster fisheries. The use of gear modifications as a management tool has been determined to be important in order for the agency to meet objectives under the MMPA and ESA. It is an independent action being implemented to achieve a specific objective and is therefore not expected to establish a precedent for future actions.

Section 6.0 of the EA examines the cumulative effects of this final rule and another proposed rule which would implement dynamic area management also designed to reduce the risk posed to right whales from gillnet and lobster trap gear. Based on the information presented, it does not appear that these two actions, occurring nearly simultaneously, and which have independently been determined to individually have insignificant impacts on society, will result in cumulatively significant impacts.

There is no evidence that the implementation of gear modifications will adversely affect entities listed in or eligible for listing in the National Register of Historic Places or will cause loss or destruction of significant scientific, cultural, or historic resources. Compliance with these restrictions is, by definition, not likely to result in the permanent loss or destruction of resources.

The basis for this proposed action is to offer additional protection to the critically endangered right whale. It is expected that other protected marine mammals, to the extent their distribution and abundance coincides with concentrations of right whales, will benefit from the imposition of gear modifications. There is no evidence that threatened or endangered species will be adversely affected by these gear modifications. Similarly, there is no evidence that implementation of gear modifications is likely to result in a violation of a Federal, state or local law for environmental protection. In fact, gear modifications would be expected to support Federal, state and local laws for environmental protection because it is expected that their goals and objectives would be similar to those of the MMPA and ESA. The implementation of gear modifications would not result in any actions that would be expected to result in the introduction or spread of a nonindigenous species.

In view of the analysis presented in this document, it is hereby determined that the implementation of gear modifications, as described in section 3.1 of this document, will not significantly affect the quality of the human environment with specific reference to the criteria contained in NAO 216-6 implementing the National Environmental Policy Act. Accordingly, the preparation of an Environmental Impact Statement for this proposed action is unnecessary.

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Date

8.0 REGULATORY IMPACT REVIEW (RIR)

8.1 Executive Order (E.O.) 12866

The RIR is intended to assist NMFS decision making by selecting the regulatory action that maximizes net benefits to the Nation.

Framework for Analysis

Net National benefit is measured through economic surpluses, consumer and producer surplus. The proposed action will provide for the protection of right whales through implementation of gear modifications to the lobster and gillnet fisheries. Within this setting, consumer surplus is associated with the value of right whales and the consumer surplus associated with seafood products supplied by the lobster and gillnet fisheries. The value of right whale protection is comprised of non-consumptive use and non-use values. Non-consumptive use value is associated with activities such as whale watching while non-use value is associated with the satisfaction that people derive from knowing that right whales exist. Producer surplus is associated with the economic profit earned by businesses engaged in the lobster and gillnet fisheries as well as that earned by businesses providing transportation services to individuals that want to view right whales.

When comparing a regulatory action to the status quo or "no action" alternative, it is the change in net National benefit that becomes the focal point of analysis. Given the finding that the status quo alternative does not afford adequate protection, the consumer surplus (non-consumptive use and non-use value) associated with improved right whale protection will be superior to that of the status quo. Further, regulatory alternatives that afford higher protection will yield higher benefits. However, the relative magnitude of protection provided by the regulatory alternatives is not known at this time and given the fact that entanglement is not the only source of mortality the likelihood that right whale stocks will recover even under the most extreme action is unknown. Given these uncertainties each of the alternatives considered for regulatory action are assumed to yield equivalent right whale protection. Thus, consumer surplus for right whale protection may be assumed to be equivalent for all alternatives. Similarly, the producer surplus associated with businesses providing whale watching services will be the same for all regulatory alternatives and will be superior to that of the status quo.

Both consumer surplus and producer surplus for seafood products supplied by the lobster and gillnet fisheries will be affected by the right whale protection measures. These effects will manifest themselves through the proposed gear modification costs. The gear modifications will increase harvesting costs which will result in a reduction in quantities supplied to seafood markets and higher prices to consumers. The magnitude of these changes and how the surpluses will be redistributed between consumers and producers will depend on the slopes of the respective supply and demand functions. In any case, as long as demand functions are downward sloping and supply functions are upward sloping, there is always a loss in economic surplus when regulatory costs are imposed. However, this loss in economic surplus will be minimized by selecting the least costly regulatory alternative.

Since each of the regulatory alternatives achieve the same level of right whale protection benefits net National benefit will be maximized through selection of the least cost gear modifications. For this reason, a cost-effectiveness analysis is presented in the following section..

8.2 Regulatory costs to Lobster and Sink Gillnet Fleet for Gear Modifications

This is an extension of an earlier economic analysis presented in the EA of the Interim Final Rule of the Atlantic Large Whale Take Reduction Plan (2000). The lobster and gillnet fleet are affected by this regulation. The present analysis includes additional gear modifications recommended by the ALWTRT. The following four alternatives are evaluated: 1) Status Quo (NMFS, 2000); 2) the PA, and 3) two additional "Non-Preferred" alternatives (NPA1 and NPA2). The detailed economic analysis of the alternatives for the lobster fleet and gillnet fleet are in Sections 5.1.2, 5.3.2 and 5.4.2, respectively.

Under the 2001 PA plan the lobster in the northern inshore, northern offshore and southern nearshore are required to attach weak links of appropriate breaking strength at the top of the buoy line. In the mid-Atlantic, sink gillnets must attach weak links at the top of the buoy line, in the middle of each 50 fathom net panel and they must use anchors with holding strengths equivalent or greater than a 22 pound Danforth anchor if they do not return to port with their gear. Under the NPA 1 plan, there are 3 gear requirements which include: 1) the PA plan requirements; 2) a weak link at the bottom of each buoy line; and 3) replacement of ground and buoy lines with either neutrally buoyant or sinking line. In the case of the sink gillnet fishery, the buoy and anchor lines are replaced under the NPA 1 plan. Under the NPA 2 plan, all buoy lines are replaced with an acoustical release device for each buoy, and all ground lines are replaced with either neutrally buoyant of sinking line.

Industry

The total lower bound costs to the lobster industry under the proposed 2001 PA, NPA1 and NPA2 plan are $849K, $41,047K, and $984,565K, respectively (Table 8.2.1). The total upper bound costs to the lobster industry are $3,915K, $127,336K, and $3,192,759K for the 2001 PA, NPA1, and NPA2 plan, respectively (Table 8.2.1). The total cost to the gillnet industry under the 2001 PA, NPA1, and NPA2 plan is $99K, $694K, and $12,598K, respectively (Table 8.2.2). A point estimate was derived for the gillnet fleet.

This rule is not considered to have a significant impact on the lobster and sink gillnet fleet since the annual effect is less than $100M.

Table 8.2.1 Average lower bound (LB) and upper bound (UB) cost per vessel and total industry costs within the lobster fleet under the 2001 PA, NPA 1 and NPA 2 plan by area.

Vessel ($1)						
	PA		NPA 1		NPA 2	
	LB	UB	LB	UB	LB	UB
N.Inshore	139	648	5,297	17,841	158,079	517,597
N.Offshore	97	218	50,212	105,849	130,952	271,581
S.Nearshore	0	0	3,411	10,743	73,933	224,263
Industry ($1,000s)						
	PA		NPA 1		NPA 2	
	LB	UB	LB	UB	LB	UB
N.Inshore	832	3,877	31,653	106,745	945,628	3,096,261
N.Offshore	17	38	8,637	18,206	22,524	46,712
S.Nearshore	0	0	757	2,385	16,413	49,786
Total	849	3,915	41,047	127,336	984,565	3,192,759

Table 8.2.2 Average cost per vessel and total industry costs within the sink gillnet fleet under the 2001 PA (for vessels who require anchors (A) and do not require anchors (NA)), NPA 1 and NPA 2 plan by area.

Vessel ($1)			
	PA	NPA 1	NPA 2
Mid-Atlantic	657(A) 88(NA)		
Nearshore		1,009 (A) 440 (NA)	22,817
Offshore		4,349 (A) 3,789(NA)	44,516
Industry ($1000s)			
	PA	NPA 1	NPA 2
Mid-Atlantic	99		
Nearshore		225	8,146
Offshore		469	4,452
Total	99	694	12,598

8.3 Final Regulatory Flexibility Analysis

This action would implement additional gear modifications to protect concentrations of North Atlantic right whales. The objective of this proposed action, issued pursuant to authority in § 118 of the MMPA, is to reduce the level of serious injury to and mortality of North Atlantic right whales in East Coast lobster trap and finfish gillnet fisheries. The impacted fishing communities includes gillnet and lobster trap fishermen. The geographic range of the gear modifications will include the northern inshore area, offshore area, and the Mid-Atlantic waters area. The potential sizes of the fleets impacted are: the northern inshore fleet is potentially as large as 5,982 vessels, the offshore fleet is potentially as large as 172 vessels, and the Mid-Atlantic fleet is potentially as large as 625 vessels. This proposed action contains no reporting, record keeping requirements. However, it does require modifications to lobster and sink gillnet gear. There are no relevant Federal rules that duplicate, overlap, or conflict with the final rule.

Four alternatives were evaluated in this EA, including a status quo or "no action" alternative, the PA, and two other alternatives.

The No Action alternative would leave in place the existing regulations promulgated under the ALWTRP. Section 229.32(g)(2) of Title 50 of the Code of Federal Regulations implementing the ALWTRP allows the NMFS Assistant Administrator to revise the ALWTRP in response to the determination that certain gear types are operationally effective and reduce the potential for serious injury and mortality of endangered whales. The no action alternative would result in no additional economic burden on the fishing industry, at least in the short-term. However, if the status quo is maintained now, more restrictive and economically burdensome measures than those in this rule may be necessary in the future to protect endangered right whales from the fisheries. The no action alternative was rejected because it would not enable NMFS to meet the RPA measures of the BO required under the ESA.

The proposed action is to implement the gear modifications as stated for the areas described. In the northern inshore area, the total lower and upper bound cost per vessel in the lobster fleet under the PA plan is $139 and $648, respectively (Table 8.2.1). The cost of the PA plan would reduce a vessel's annual revenue between 0.1% (0.001=$139/$140,900) and 0.5% (0.005=$648/$140,900). Given there are 5,982 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $832K and $3,877K, respectively. NMFS accepted this alternative as these gear modifications are necessary to avoid jeopardizing the continued existence of North Atlantic right whales and enable NMFS to meet a portion of the RPA in the BO's.

In the northern offshore area, the total lower and upper bound cost per vessel in the lobster fleet under the PA plan is $97 and $218, respectively. The cost of the PA plan would reduce a vessel's annual revenue between 0.01% (0.0001=$97/$531,200) and 0.04% (0.0004=$218/$531,200). Given there are 172 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $17K and $38K, respectively. In the southern nearshore area, there is no additional cost to the lobster fleet under the PA plan.

In the Mid-Atlantic (southern nearshore and southern offshore) under the PA plan, the average cost per sink gillnet vessel is $657 to attach weak links at the top of the buoy line, in the middle of each 50 fathom net panel, and to purchase a 22 pound Danforth anchor (Table 8.2.2). The cost of the PA plan would reduce a vessel's annual revenue by 0.7% (0.007=$657/$89,000). If a vessel does not have to purchase an anchor the average cost per vessel is $88. The total industry cost to the mid-Atlantic sink gillnet fishery is $99K.

The second alternative (NPA 1) would consist of the PA as well as the use of full weak links at the surface and bottom of the buoy line and the reduction of floating line. The costs of this alternative are provided here in summary form. This alternative was rejected as the the operational impacts of the bottom weak link may be large for the fishermen and result in negative impacts on the North Atlantic right whale. The ability to haul back gear successfully while employing a bottom weak link has not been developed and the potential for gear loss is considered high at this point. Gear left on the bottom without surface representation, such as buoy or high flyer, is difficult to recover and becomes ghost gear which continues to fish and still presents an entanglement risk to the North Atlantic right whale.

Lobster Fleet in the Northern Inshore Area

The average lower and upper bound cost per vessel in the lobster fleet under the NPA 1 plan is $5,297 and $17,841, respectively (Table 8.2.1). The cost of this plan would reduce a vessel's annual revenue between 3.8% (0.038=$5,297/$140,900) and 12.7% (0.127=$17,841/$140,900). Given there are 5,982 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $31.7M and $106.8M, respectively.

In the northern offshore area, the average lower and upper bound cost per vessel in the lobster fleet under the NPA 1 plan is $50,212 and $105,849, respectively. The cost of this plan would reduce a vessel's annual revenue between 9.5% (0.095=$50,212/$531,200) and 19.9% (0.199=$105,849/$531,200). Given there are 172 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $8.6M and $18.2M, respectively.

In the southern nearshore area, the average lower and upper bound cost per vessel in the lobster fleet under the NPA 1 plan is $3,411 and $10,743, respectively. The cost of this plan would reduce a vessel's annual revenue between 3.2% (0.032=$3,411/$105,600) and 10.2% (0.102=$10,743/$105,600). Given there are 222 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $0.8M and $2.4M, respectively.

Sink Gillnet Fleet
In the southern nearshore area, the average cost per vessel in the sink fleet under the NPA 1 plan is $1,009 if an anchor is required and $440 if an anchor is not required under the PA plan (Table 8.2.2). Given there are 357 vessels potentially fishing sink gillnet gear, the total industry cost is $225K. In the southern offshore area, the average cost per vessel in the sink fleet under the NPA 1 plan is $4,349 if an anchor is required and $3,780 if an anchor is not required under the PA plan. The cost of this plan would reduce a vessel's annual revenue by 4.6% (0.046=($4,349+$3,780)2/$89,000). Given there are 100 vessels potentially fishing sink gillnet gear, the total industry cost is $469K.

The third alternative (NPA 2) would consist of the PA as well as buoy line removal and the reduction of floating line. The costs of that alternative are provided here in summary form. This alternative was rejected as other fishermen will not know where gear has been set, and gear conflicts with both fixed and mobile gear are likely to result in lost and/or damaged gear possibly resulting in an increase in ghost gear. Ghost gear is a potential entanglement source and source of negative impacts on North Atlantic right whales. Thus, this option may only be feasible in areas where other gear cannot be set or can be strictly controlled.

Lobster Fleet
In the northern inshore area, the total lower and upper bound cost per vessel in the lobster fleet under the NPA 2 plan is $158.1K and $517.6K, respectively (Table 8.2.1). Since the average vessel's annual revenue is less than the cost of this plan ($140.9K on average), we expect vessels to exit this fishery under this plan. However, they may hold permits in other fisheries and continue to operate. Given there are 5,982 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $945.6M and $3,096.2M, respectively.

In the northern offshore area, the total lower and upper bound cost per vessel in the lobster fleet under the NPA 2 plan is $131.0K and $271.6K, respectively. The cost of this plan would reduce a vessel's annual revenue between 24.7% (0.247=$131,000/$531,200) and 51.1% (0.511=$271,600/$531,200). Given there are 172 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $22.5M and $46.7M, respectively.

In the southern nearshore area, the total lower and upper bound cost per vessel in the lobster fleet under the NPA 2 plan is $73.9K and $224.3K, respectively. Since the lower bound cost of this plan is 70% of a vessel's annual revenue($105.6K on average) and the upper bound cost is greater than their annual revenue, we expect vessels to exit

this fishery under this plan. However, they may hold permits in other fisheries and continue to operate.
Given there are 222 vessels potentially fishing lobster gear, the total lower and upper bound cost to the industry is $16.4M and $49.8M, respectively.

Sink Gillnet
In the southern nearshore area, the average cost per vessel in the sink fleet under the NPA 2 plan is $22.8K (Table 8.2.2). The cost of this plan would reduce a vessel's annual revenue by 25.6% (0.256=$22,800/$89,000).
Given there are 357 vessels potentially fishing sink gillnet gear, the total industry cost is $8.1M. In the southern offshore area, the average cost per vessel in the sink fleet under the NPA 2 plan is $44.5K. The cost of this plan would reduce a vessel's annual revenue by 50% (0.500=$44,500/$89,000). Given there are 100 vessels potentially fishing sink gillnet gear, the total industry cost is $4.5M.

NMFS has taken steps to minimize the significant economic impact on small entities through this PA. The PA meets a portion of the RPA designed to remove jeopardy, consistent with the requirements of the ESA, while allowing fishing to continue and, therefore, reduces economic impacts compared to fishery closures. NMFS has taken steps to minimize the significant economic impact on small entities through this PA. The PA meets a portion of the RPA designed to remove jeopardy, consistent with the requirements of the ESA, while allowing fishing to continue and, therefore, reduces economic impacts compared to fishery closures. Compliance cost of the various alternatives, as a percentage of total operating costs, could not be determined due to a lack of operating cost data. Therefore, no determination is made on whether the compliance cost for the PA (which minimizes impacts to these fleets) would result in significant economic impacts. The analysis for the RIR and RFA provides the possible impacts for those actions based on the data available.

9.0 APPLICABLE LAW

9.1 National Environmental Policy Act

NMFS prepared this Environmental Assessment in accordance with the National Environmental Policy Act.

9.2 Endangered Species Act

A BOs on the three Fishery Management Plans (FMP) for the monkfish, spiny dogfish, and multispecies fisheries, and the Federal regulations for the lobster fishery were issued on June 14, 2001. The BOs concluded that the FMPS and lobster regulations jeopardize the continued existence of North Atlantic right whales. Therefore, NMFS defined a Reasonable and Prudent Alternative (RPA) with multiple management components to the proposed action. Among the RPA elements was a requirement to expand lobster and gillnet gear modifications to the Mid-Atlantic, Offshore Lobster and Southeast areas regulated by the ALWTRP. The proposed action is intended to implement the gear modification element of the RPA.

9.3 Marine Mammal Protection Act

The proposed action to expand gear modifications will not adversely affect marine mammals because the proposed action will provide additional risk reduction in the effort to reduce serious injury and mortality due to entanglement in lobster and gillnet gear.

9.4 Paperwork Reduction Act

This final rule does not contain a collection of information requirement for the purposes of the Paperwork Reduction Act.

9.5 Essential Fish Habitat

The area affected by the final rule has been identified as EFH for species in the Northeast groundfish, sea scallops, monkfish, and spiny dogfish FMPs. This final rule will not have an adverse impact on EFH; therefore, an EFH consultation is not required.

10.0 REFERENCES

ALWTRT 2001. Draft Atlantic Large Whale Take Reduction Team Meeting Summary. Summary prepared by RESOLVE, Inc. and submitted to the National Marine Fisheries Service July 16, 2001.

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NMFS 1997. Environmental Assessment and Regulatory Impact Review of the Atlantic Large Whale Take Reduction Plan and Implementing Regulations. NMFS Northeast Regional Office. July 1997. 77pp.

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NMFS 2000. Environmental Assessment of the Atlantic Large Whale Take Reduction Plan and Implementing Regulations. NMFS. Northeast Region. December 2000.

NMFS 2001. Endangered Species Act section 7 consultation. Biological opinion regarding Fishery Management Plans for monkfish, spiny dogfish, and multispecies and Federal regulations for American lobster. June 14, 2001.

Wilson, James and Plantinga, Andrew. 1997. The Economic Impact of Proposed ALWTRT Regulations. University of Maine. Orono, Maine.

1. The cost of replacing the anchor is incurred by 94 vessels in New Jersey and North Carolina. The average cost per vessel is $657 for these 94 vessels and $88 for the vessels that do not need to purchase anchors.